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Chick-a-Dude

A Reading A-Z Level W Benchmark Book

Word Count: 1,117



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Chick-a-Dude



Written by Alyse Sweeney • Illustrated by Frank Mayo

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Correlation

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An Unexpected Guest

Ffffffft. Christine's mom struck the match and lit the kiln as the potters circled the furnace. They pictured the freshly sculpted beads, bowls, mugs, and vases waiting to bake on the **kiln** shelf at 2,000 degrees Fahrenheit. They imagined how the glaze would make each earthenware piece come alive in brilliant, shiny colors.

Since second grade, Christine Brice came to her mom's **pottery** studio on Fridays after school. Christine's mom created unique clay beads for jewelry, but Christine was more interested in the potter's wheel. So she learned to sculpt pottery from her mom's friend and business partner, Mrs. Rodriguez, who created earthenware bowls on a potter's wheel. Her mom said apprenticing under an expert was one of the best ways to learn a craft.

"Your vases are so unique, Christine," cooed Mrs. Rodriguez, wiping her clay-covered hands with a towel. "I bet they sell out at the craft fair."

"I'm just excited they're considered good enough to be entered in the community-wide fair!" squealed Christine.

"Shhhh! Do you hear that sound?" interrupted Mrs. Brice.

The potters froze everything except their eyes, which shot up to the rafters.

Chirp, chirp, chirp.

“Well, I’ll be!” exclaimed Mrs. Rodriguez.

A baby robin struggled out of a dark corner. *Scratch scratch. Scratch scratch.* The chick walked shakily along the rafters—unaware that its life was in danger not only from the increasing heat, but also from an accidental tumble to the wooden planks below.

“It’s too late to turn off the kiln!” panicked Mrs. Brice. “That chick will **roast** up there!”

“Ladies, we’ve got to **rescue** that little fella!” said Mrs. Rodriguez, heading for the heavy, metal ladder. Single-handedly, she carried in and set up the 12-foot-ladder. Then, like a firefighter rescuing a kitten from a tree, she boldly ascended the enormous ladder while carrying an empty box. She managed to coax the chick toward the box with chirping noises. The potters gathered around when she and the chick safely reached the ground.

“Well, chick,” said Mrs. Brice. “We saved you from roasting like a marshmallow, but now what?”



Welcome to Our Home

Smiling broadly, Christine rolled into the house holding the box on her lap.

“What’s in the box?” asked Mr. Brice, his curiosity piqued, knowing the fired pottery wouldn’t be ready until the next day. That was what typically made his daughter smile like a Cheshire cat.

“Yeah, what’s in the box?” echoed Christine’s brother, Rick.

The chick answered the question for both of them with a chirp like a high-pitched whistle.



Christine spoke a mile a minute as she described the rescue and how they waited for the mama bird to return. She explained how they waited and waited, but the chick’s mother failed to appear, so Christine **volunteered** to care for the chick until it was strong enough to fly.

“Rick, would you grab the aquarium from the attic? I think it will be perfect,” said Christine.

As Rick flew out of the kitchen, Misty entered. She slowly headed to the box—ears perked, tail stiff, hair up. Her nose twitched as rapidly as a hummingbird’s wings—furiously sniffing the chick she couldn’t see. Then she broke into a deep and angry bark.



“Uh-oh,” said Christine, grabbing Misty’s collar just in time. Misty obeyed commands most of the time, however, the temptation appeared to be too much for her training. She struggled against Christine’s grip as Mrs. Brice and Rick transferred the chick from the box to the aquarium. Mrs. Brice cleared a high shelf in the kitchen for the chick’s aquarium—safe from their 110-pound bounding Labrador retriever, Misty. Mrs. Brice lined the aquarium with newspaper, placed a shallow dish of water in the corner, and folded one of Rick’s soccer socks into a cozy nest.

When Rick asked what robin chicks eat, Mr. Brice grabbed a plastic cup and headed to the garage for shovels and flashlights. “Worms,” he called over his shoulder. “Let’s get digging, gang!”

“Chirp, chirp, chirp!” Christine squeaked as she dropped worms into the chick’s gaping beak after her family’s garden-digging adventure.

She then helped her parents prepare the family’s dinner. After their own stomachs were full, the Brices watched the chick gobble up more worms, then they all headed to bed.



Before crawling under the covers with her novel, Christine went online using her computer and Web browser and learned that in addition to worms, robins eat berries and fruit, such as grapes, cherries, and tomatoes.

At breakfast, Christine **mimicked** a mama bird by “chirp, chirp, chirping” as she dropped worms and grape halves into the chick’s waiting beak. Over buckwheat waffles and strawberries, the family voted to name the chick Chick-a-Dude because, as Rick commented, “He looks like a cool dude when he sticks out his chest.”

Wearing Out His Welcome

All morning, Chick-a-Dude looked to the nearest person for food whenever he heard, “Chirp, chirp, chirp.” Everyone enjoyed the fluffy chick—everyone, that is, except Misty, whose stress level had not decreased since the Brices took Chick-a-Dude into their home. That afternoon, while Christine wrote invitations in her bedroom for her upcoming birthday party, Misty sat beneath Chick-a-Dude’s aquarium in the kitchen and stared at the unwelcome houseguest.

“WOOF! WOOF!”

A terrified Chick-a-Dude sprung into the air as though lifted like a puppet by a string and landed—plonk!—in an empty stew pot on the stovetop.



Christine heard the commotion and raced to the kitchen. “I think we need to get you to a safer place,” she told Chick-a-Dude, “and give you your **territory** back,” she told Misty.

A Home of His Own

“You must be Christine and Chick-a-Dude,” guessed a woman named Kay as they entered the yard gate. “We spoke on the phone. I’m so glad you found us on the Internet.”

“My mom drove me right over after we spoke.”

“You did the right thing by bringing Chick-a-Dude to the Wildlife Rescue Center,” said Kay. “Hundreds of species of injured or **orphaned** wildlife—mammals, birds, and reptiles—come through these doors, and our staff is trained to provide the best possible care for all of them.”

Kay went on to explain that a veterinarian would examine Chick-a-Dude. Then, because Chick-a-Dude already had his flight feathers, he’d stay in the flight cage where he’d practice flying with other rescued birds. He’d be fed every 30 minutes by hand—food and vitamins. After two or three weeks of all this **nurturing**, he’d be released into the wild near other robins where he should thrive.



“What a relief!” said Christine, scooping pasta onto everyone’s plate that evening. “Chick-a-Dude’s going to be A-Okay.”

“That chick was totally cool,” added Rick. “I’ll miss the little guy’s ‘chirp, chirp, chirping’.”

“Grrrrrr WOOF!” Misty growled as she slept curled up on her pillow.

“Misty won’t,” giggled Mrs. Brice.

Glossary

kiln (<i>n.</i>)	a special oven used to heat clay to make pottery (p. 4)
mimicked (<i>v.</i>)	to have copied a sound or behavior of something or someone else (p. 10)
nurturing (<i>v.</i>)	giving of care and protection to a young organism so that it can grow and develop (p. 12)
orphaned (<i>adj.</i>)	being without a mother or father (p. 12)
pottery (<i>adj.</i>)	related to the art of making objects from moist clay that is hardened by heating in a kiln (p. 4)
rescue (<i>n.</i>)	the act of saving somebody or something from harm (p. 5)
roast (<i>v.</i>)	to become too warm from a source of heat such as a fire or oven (p. 5)
territory (<i>n.</i>)	land an animal defends against intruders because it considers the land its own (p. 12)
volunteered (<i>v.</i>)	to have provided help without being asked (p. 8)

Reading a-z Running Record

Level W

Student's Name _____ Date _____

Chick-a-Dude
154 words

Have the student read out loud as you record.

Assessed by _____

page	E = errors S-C = self-correction M = meaning S = structure V = visual	E	S-C	E			S-C		
				M	S	V	M	S	V
4	An Unexpected Guest Fffffff. Christine's mom struck the match and lit the kiln as the potters circled the furnace. They pictured the freshly sculpted beads, bowls, mugs, and vases waiting to bake on the kiln shelf at 2,000 degrees Fahrenheit. They imagined how the glaze would make each earthenware piece come alive in brilliant, shiny colors. Since second grade, Christine Brice came to her mom's pottery studio on Fridays after school. Christine's mom created unique clay beads for jewelry, but Christine was more interested in the potter's wheel. So she learned to sculpt pottery from her mom's friend and business partner, Mrs. Rodriguez, who created earthenware bowls on a potter's wheel. Her mom said apprenticing under an expert was one of the best ways to learn a craft. "Your vases are so unique, Christine," cooed Mrs. Rodriguez, wiping her clay-covered hands with a towel. "I bet they sell out at the craft fair."								
Totals									

Accuracy Rate:

Error Rate:

Self-correction Rate:

The Sun, Earth, and Moon

A Reading A-Z Level W Benchmark Book

Word Count: 1,211

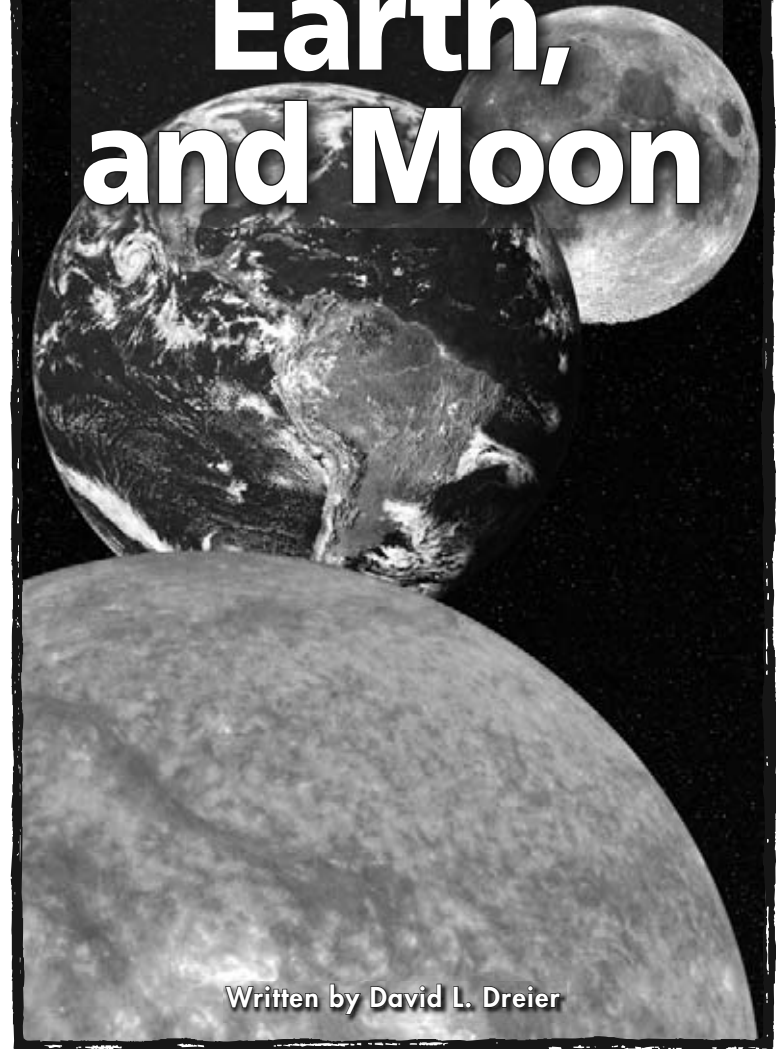


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The Sun, Earth, and Moon



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Craters on Earth's Moon

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Sun, Earth, and Moon

Three Important Celestial Bodies

The solar system is our home in the Milky Way Galaxy, a huge spiral of stars, gas, and dust. The solar system consists of the Sun, the planets, their moons, and various kinds of debris. But to us, the three most important objects in the solar system are the Sun, our own planet Earth, and Earth's Moon.

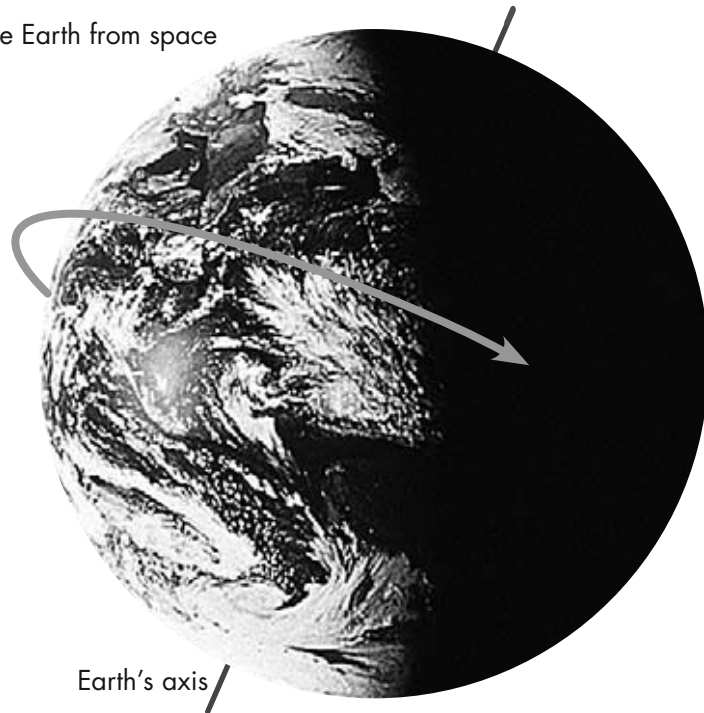
The planets and their moons are always moving—the planets circle the Sun, and the moons circle the planets. It is a ballet of movement that has gone on for billions of years. In this book, we will examine the movements of the Earth and Moon in relation to each other and to the Sun.

The Movements of the Earth

Earth, as all planets and moons in the solar system, undergoes two main movements: **rotation** and **revolution**.

Rotation is the turning of Earth around its axis, an imaginary line that runs vertically through the center of the planet. A single rotation of Earth takes 24 hours. It is Earth's rotation that produces the endless cycle of day and night. When one side of the planet is rotated toward the Sun, it is day on that half of the planet. At the same time, it is night on the other half of the planet.

The Earth from space



Earth's axis

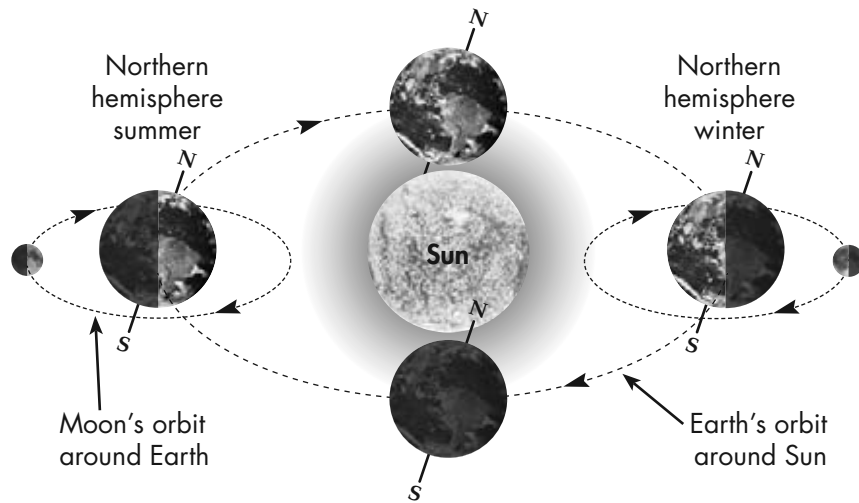
Earth's revolution is its long orbit around the Sun, which takes about 365 days. One full year thus corresponds to one complete orbit of Earth around the Sun. Actually, a single revolution of our planet around the Sun takes $365\frac{1}{4}$ days. That is why a leap year must be added to the calendar every four years. A leap year contains one extra day—February 29—which absorbs those four extra quarter days and keeps the calendar in line with the seasons.

Leap years date to the reign of Julius Caesar in ancient Rome. In 1582, Pope Gregory XIII further refined the calendar to make up for a slight error that accumulated over centuries with leap years. We still use Pope Gregory's system, which skips three leap years every four centuries.



Pope Gregory XIII, the man responsible for our current calendar

Northern Hemisphere Summer and Winter

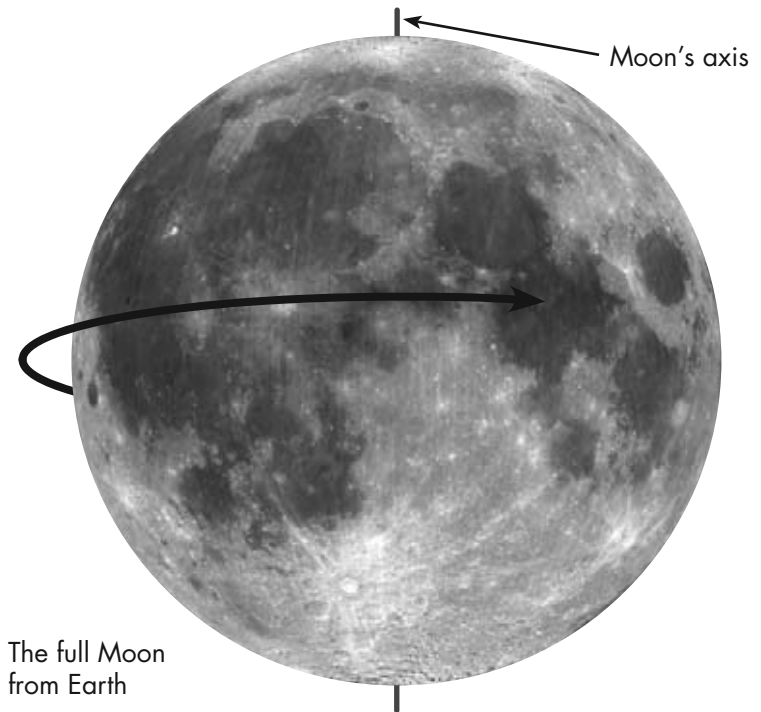


The near-circle out in space that Earth traces in its orbit around the Sun is called its orbital plane. Earth's axis is tilted about $23\frac{1}{2}$ degrees away from its orbital plane. This tilt is what causes the seasons. When the northern hemisphere—the northern half of the planet—is tilted toward the Sun, it is summer in that part of the world. At the same time, it is winter in the southern hemisphere. Half a year later, it is the southern half of the planet that is tilted toward the Sun. Then it is summer there and winter in the northern hemisphere.



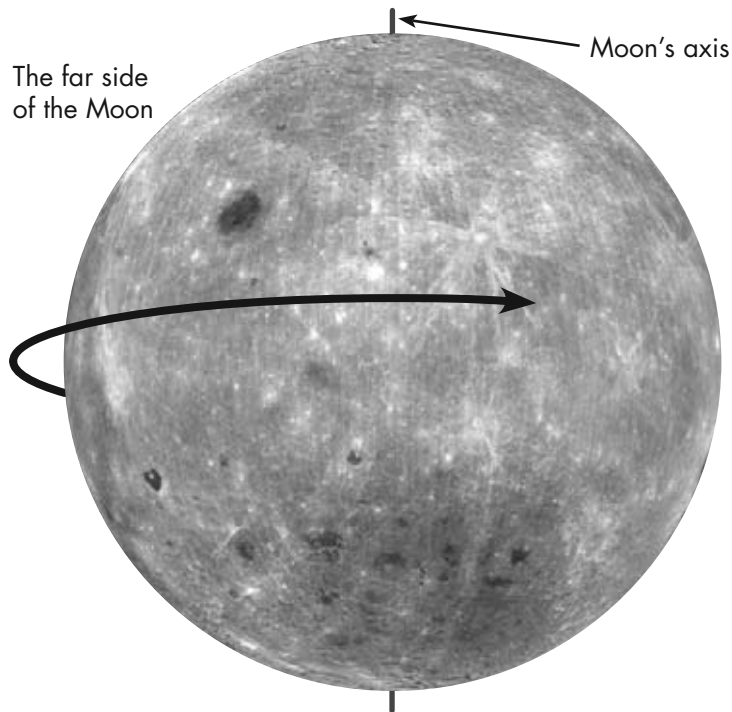
The Rotation and Revolution of the Moon

Just as Earth turns on its axis and revolves around the Sun, the Moon turns on its axis and revolves around the Earth. But there is one big difference between the movements of the Earth and Moon. The Earth's periods of rotation and revolution are very different: 24 hours and 365 days. For the Moon, these two movements each take the same amount of time—just over 29-1/2 days. Every 29-1/2 days, the Moon revolves once around Earth and turns once on its axis. Because of that, the Moon always has the same face turned toward Earth.



There is nothing mysterious about these two movements occurring in the same amount of time. They are a result of the pull of **gravity** between Earth and the Moon. The matching of rotational and orbital periods is called synchronous rotation, and it is common in the universe.

Many people think that there is a permanent “dark side” of the Moon, but that is wrong. It is correct to speak of the “far side” of the Moon—the side always turned away from Earth. That side receives just as much sunlight as the side that faces us, just at opposite times. When we see a full Moon, the far side is in darkness. But when there is a new Moon, and we see the Moon as dark, the far side of the Moon is in full sunlight.

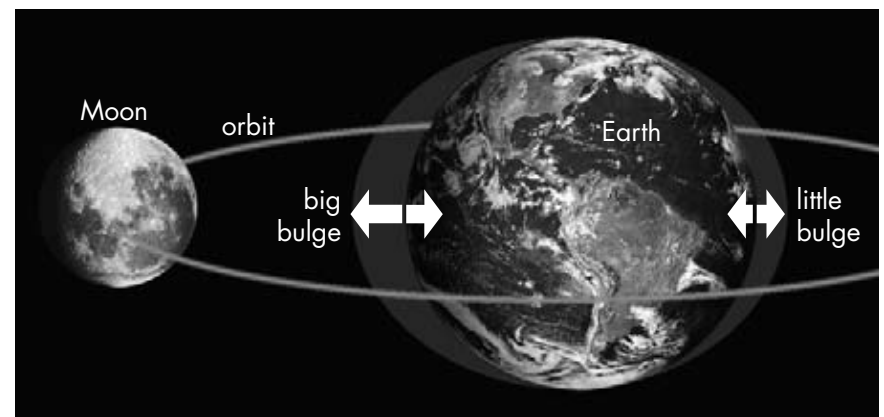


The Tides

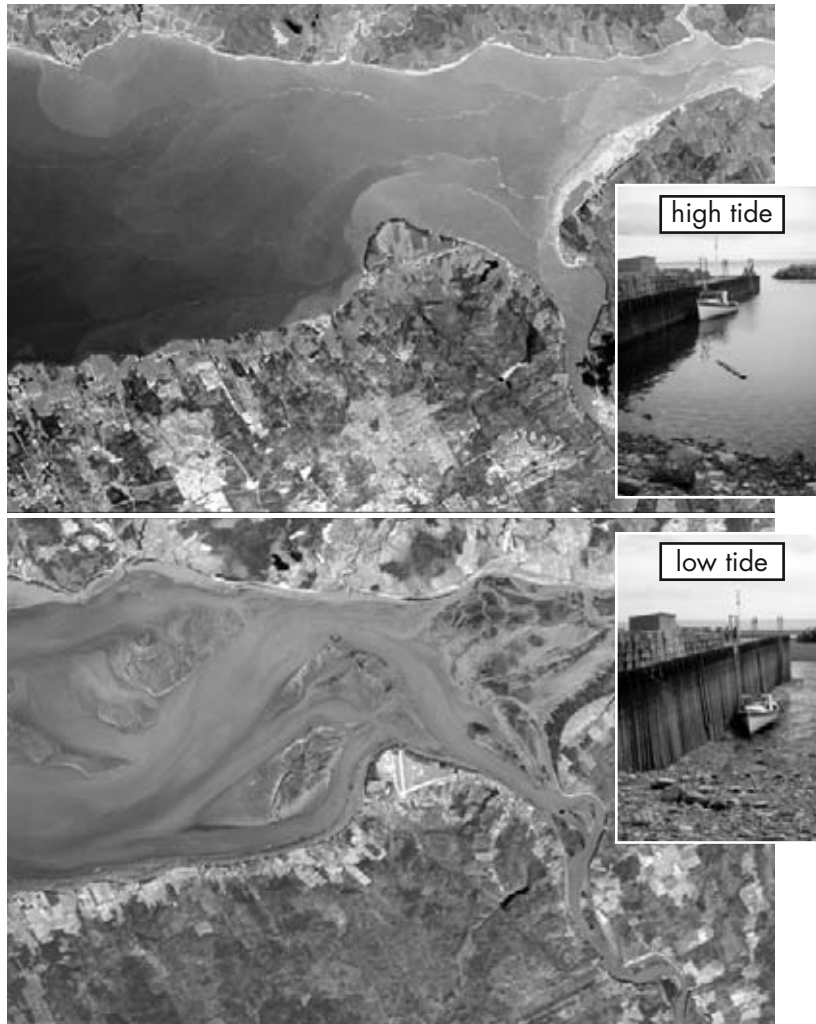
Both the Sun and Moon affect Earth with their gravity. It is the Sun's enormous gravity that keeps Earth in orbit around the Sun. Earth's gravity keeps the Moon in an endless orbit around our planet. However, the Moon, though small compared to the Earth and Sun, also exerts a gravitational pull.

The gravitational pulls of the Sun and Moon produce the **tides** in our planet's oceans. The Moon is much closer to us than the Sun. For that reason, it has a stronger tidal effect than the Sun does.

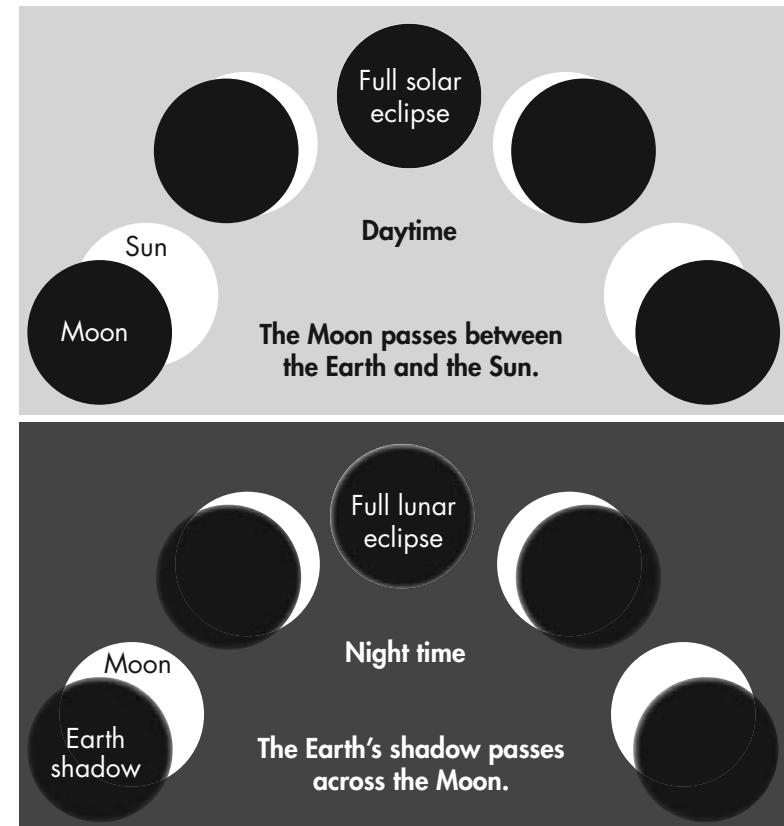
The pull of the Moon's gravity causes the oceans to bulge toward the Moon. Because of the way tidal forces act, the Moon's gravity also causes a bulge to occur on the opposite side of the planet.



The Moon effects the tides on Earth.



As Earth rotates, the high point of a bulge reaches any particular shoreline once every 12 hours. The rising water that this causes is called high tide. When the bulge passes and the water goes out again, it is called low tide. There are two high tides and two low tides in each 24-hour period.



Lunar and Solar Eclipses

As the Earth and Moon move through space, they sometimes get lined up with the Sun. When that happens, the result is a dramatic effect called an **eclipse**. There are two kinds of eclipses, lunar (Moon) eclipses and solar (Sun) eclipses. A lunar eclipse occurs when the Moon is in Earth's shadow from the Sun. A solar eclipse occurs when the Moon passes between Earth and the Sun.

A lunar eclipse is a phenomenon of haunting beauty. As a full Moon passes through Earth's shadow it is illuminated only by rays of sunlight that are scattered through our planet's atmosphere. This light has a reddish cast, so the Moon turns a deep red. A lunar eclipse is visible from the entire side of Earth experiencing night time and can last for more than 1-1/2 hours.



Steps showing how Earth casts a shadow over the Moon during a lunar eclipse



A total solar eclipse

There is no more spectacular sight on Earth than a total eclipse of the Sun. By a coincidence of nature, the Sun and Moon, as seen from Earth, have exactly the same diameter. Because of that, when the Moon passes between Earth and the Sun, it perfectly blocks the Sun's disk. The disk is then blocked for several minutes. During that time, the Sun's corona—its outer glowing gases—becomes clearly visible.

During a solar eclipse, only people in a fairly narrow path on the Earth can see a total eclipse. Most people see a partial eclipse, with part of the Sun's disk still showing. But even with a total eclipse, people are advised to view the phenomenon with special protective glasses.



A full Moon rises over Denver International Airport.

Conclusion

The movements of the Earth and Moon seem somehow exactly right. A day is just long enough to accomplish some work, have a relaxing evening, and then get enough sleep to start a new day. The length of one year also seems right. Who would want it to be half its length or twice as long? As for the Moon, its 29-1/2-day cycle of phases is almost equal to a month. We mark our days, months, and years with the movements of our planet and our Moon. And sometimes the Sun and Moon provide us with rare, beautiful displays that we remember for the rest of our lives.

Glossary

- eclipse** (*n.*) the partial or complete hiding or darkening of one celestial body, such as the Sun or the Moon, by another (p. 12)
- gravity** (*n.*) the force that draws objects toward the center of the Earth or any other large celestial body (p. 9)
- revolution** (*n.*) a complete circle made around something, such as the orbit of a planet around the Sun or of a Moon around a planet (p. 6)
- rotation** (*n.*) a single turn of something around an axis or a fixed point; spinning (p. 5)
- tides** (*n.*) the regular rise and fall of the ocean produced by the gravity of the Moon and Sun (p. 10)

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Reading a-z Running Record

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The Sun, Earth, and Moon
158 words

Have the student read out loud as you record.

Assessed by _____

page	E = errors S-C = self-correction M = meaning S = structure V = visual	E	S-C	E			S-C		
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Totals									

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Self-correction Rate:

Desert People

A Reading A-Z Level W Leveled Reader

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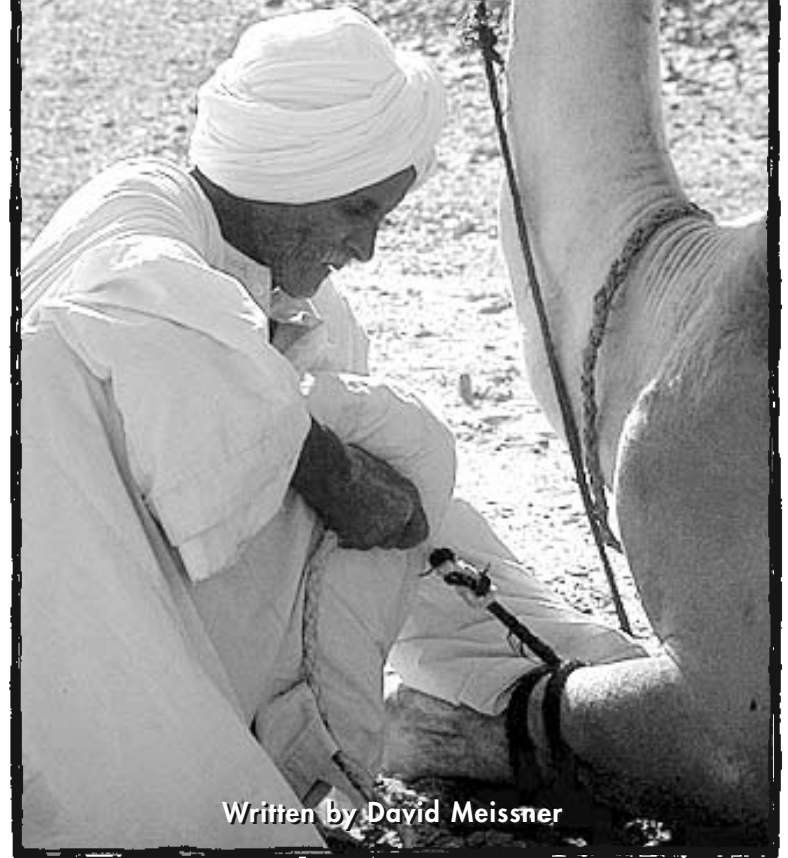


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Desert People



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PRONUNCIATION GUIDE

Bedouin: (BED-oo-in)

Tohono O'odham: (toe-HOE-noh aw-aw-TAM)

Desert People
Level W Leveled Reader
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At dusk, the desert is still.

Demanding Deserts

Imagine that you are standing alone in the desert. There is total silence, except for the soft call of a dove. The fresh breeze feels good on your face. The sun begins to rise over the mountains, which slowly change from black to light purple. Then the sun's rays peek out and turn the morning into day.

Look around you. Imagine that your family and friends also live here. What would your lives be like? A few hundred years ago, there were no cars, no bicycles, and no paved roads in this desert. How would you travel from place to place?

Imagine that you feel hungry in this desert. There are no stores or supermarkets. Can you feel the thirst in the back of your throat? Where would you find water to drink? You look around. There are no drinking fountains and no flowing rivers. There is not a single cloud in the light blue sky.

What Exactly Is a Desert?

Would you know a desert if you saw one? Would there be camels walking on sand dunes? Would there be rattlesnakes, saguaro cacti, and tall mountains? Or would the land be rocky, with only a few shrubs and trees?

All three of these descriptions are deserts. Many types of deserts exist. Deserts may have rocky mountains, graveled plateaus, or rolling sand dunes. Some desert areas even have streams and rivers.

Scientists disagree on the exact definition of the word “desert.” But they do agree that deserts share some common traits. Compared with the rest of the world, deserts are dry places. They usually receive less than 25.4 centimeters (10 in.) of **precipitation** a year. Deserts tend to have dry soil and not much **vegetation**. Although some deserts can get pretty cold, most deserts are sunny and hot.

Desert: a dry, barren area of land, especially one covered with sand, that is characteristically desolate, waterless, and without vegetation.*

*This is the official *New Oxford American* definition of *desert*.



An oasis in the desert

Desert Survival

So if deserts are such hot and dry places, how have people survived? Where did they find food to eat and water to drink? What did they use to build their homes?

For thousands of years, desert people have found answers to these questions. They have used local **resources** for food, water, and shelter. Desert people have found ways to adapt. Each desert is different. And each desert has its own answers.

In this book, you will learn about two interesting groups of desert people: the Tohono O’odham and the Bedouin. You will also read about sand dunes, wild foods, villages, hunting, and more. You will even read about dogs that ride on camels!

World Deserts Comparison Table					
	Sonoran	Sahara	Gobi	Atacama	
CLIMATE	Good rainfall for a desert	Very hot and very dry	Cold and windy	Driest desert in the world	
CONTINENT	North America	Africa	Asia	South America	
SIZE (sq. km.)	310,800	9,064,960	1,036,000	139,860	
TERRAIN	Flat basins, mountains	Gravel plains, mountains, sand dunes	Stony, sandy soil, grasslands	Sand, salt basins, lava	
EXAMPLE OF DESERT PEOPLE	Tohono O'odham	Bedouin	Mongols	Atacama Indians	
Compare these four deserts. Notice that they are all very different.					

The Tohono O’odham

Tohono O’odham means “The Desert People.” The Tohono O’odham are Native Americans who still live in the Sonoran Desert.

For years, they have watched the sun rise over Baboquivari (bah-bo-KEE-vray), their sacred mountain. They believe that Baboquivari is where Elder Brother created them from the clay of the earth. Elder Brother gave the desert to the O’odham and taught them how to use its plants.



For many years, they were called the Papago. Today, Tohono O’odham is the official name of the tribe.

The O’odham lived in villages. They slept in round homes with flat roofs. These homes were made of dried mud, branches, and grass. There was one main room with a fire pit in the middle. Families slept on woven grass mats. Fires provided light and heat during cold winter nights.



Baboquivari is the sacred peak of the Tohono O'odham.

The Sonoran Supermarket

Like other deserts, the Sonoran Desert can be a difficult place to live. It is hot and dry. Months may pass without any rain. Summer days can reach up to 49° Celsius (120°F). Winter nights can dip below freezing.

But as far as deserts go, the Sonoran is lush and hospitable. The Tohono O'odham lived in an area where 30.5 centimeters (12 in.) of rain fell each year. This was enough rain to support many forms of life. There were shady trees, big cacti, and even summer flowers. Insects, birds, rabbits, and coyotes lived there, too.

Some of the O'odham lived near big mountains. There they found resources the desert did not have. Different plants and animals lived up in the cooler climate. In the mountains the O'odham gathered food and hunted bigger animals. They also collected water from springs and streams.



The desert is filled with resources, if you know where to look.

A Different Kind of Shopping

If the Tohono O'odham did have a supermarket, it was their desert. When they needed vegetables, they planted seeds. When they needed water, they went to a spring. When they needed meat, they hunted animals. And if they needed pine nuts, they walked up into the mountains to find pine trees.

Fruits and Vegetables

In the early summer, O'odham men dug small holes in the ground with sharp sticks. Women dropped seeds in each hole and covered them up. These dry fields flooded when the summer rains came. The O'odham grew corn, beans, and squash this way. In the winter, they learned to grow wheat, peas, and melons.

Meat

The Tohono O'odham hunted rattlesnakes, rabbits, and birds in the desert. In the mountains, they killed deer, bighorn sheep, and sometimes even bears. To sneak up on the deer, O'odham hunters dressed in deerskins and walked on all fours.



A bighorn sheep

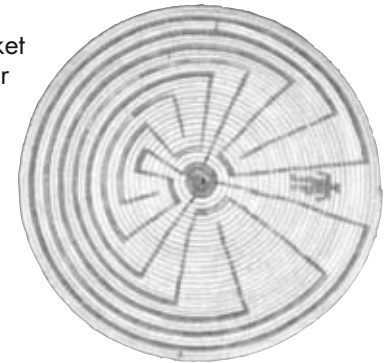
Organic Specialty Items

The Tohono O'odham also gathered food that grew in the wild. In the desert, they found chili peppers, wild onions, mesquite beans, and saguaro fruit. In the mountains, they collected acorns, roots, and pine nuts. O'odham men even made four-day trips to the ocean to get salt!

Other Native American people wanted these exotic foods, too. So the O'odham traded their salt and saguaro syrup for corn, beans, wheat, and more. This extra food helped the O'odham during times of **drought**.

O'odham women were expert basket makers. They wove yucca and bear grass together. Baskets were used to harvest and store food.

The "man in the maze" design (right) appears often in O'odham art. Some people believe that it represents the maze of life.



Drinking Water

Some O'odham villages were lucky enough to live near springs and streams. Other villages dug wells into the ground. But many people lived far away from water sources. Young girls often traveled high up into mountain canyons to fetch water.



Bedouin tents are low to the ground so the wind will not blow them over.

The Bedouin

Think of all the things in your room. Could you imagine moving to a new place every week? Would you get tired of carrying so many things? How would you enjoy the traveling life?

Traditional Bedouin people were **nomadic**. They moved from place to place on camels in search of food, water, and grazing land. The Bedouin had very few possessions. They believed their lifestyle was simple and pure. “Bedouin” means “people of the desert.”

The Bedouin lived in low, black tents. These tents protected them from the sun, wind, and blowing sand. In a matter of hours, the Bedouin could pack up their camps and move on to their next “home.” Today many Bedouins still roam the Syrian, Arabian, and Sahara deserts.



Sand dunes are found in the Sahara Desert.

The Sahara Supermarket?

The Sahara Desert is the largest desert in the world. It stretches across northern Africa for 8 million square kilometers (3.5 million sq. mi.). The Sahara is also very hot and dry. In some parts it rains less than 25 millimeters (1 in.) per year!

The Sahara Desert is less of a “supermarket” than the Sonoran Desert. Less rain falls in the Sahara. This means that fewer plants and animals live there. With few resources available, the Bedouin could not just stay in one place. They had to travel the desert in search of food and water.

The Sahara is more than sand dunes. It also has rocky plateaus, tall mountains, and oasis valleys. An **oasis** is a fertile place in the desert where there is water.

The Camel Convenience Store

Arabian camels were the Bedouin's close companions. These **sturdy** animals made nomadic life possible. Camels gave the Bedouin shelter, clothing, food, and free rides.

The Bedouin wove camel hair into tents and clothing. They also drank the camels' milk and ate the camels' meat. They even burned the camels' **dung** to fuel their campfires!

Camels were well suited for the desert. They could go for long periods of time without water. Arabian camels could walk for 50 kilometers (30 mi.) in a day. They could also carry up to 270 kilograms (600 lbs).

Some families owned many camels. Having many camels was a sign of wealth. Camels were so prized that people fought over them. The Bedouin went on raids to steal camels from others.



Arabian camels, also called dromedaries, have one hump.



Want a date?



Fruits and Vegetables

The nomadic Bedouin did not grow many crops. They were always on the move. But in late summer they camped out near oases because date palms grew there. These trees produced tasty dates. The Bedouin ate some dates fresh and dried others to save for later.

Meat

The Bedouin hunted wild herds of ostriches, wolves, foxes, and gazelles. They also trained falcons to hunt foxes and small birds for them. Sometimes dogs, called salukis, rode with the Bedouin to help track animals. Can you imagine a dog riding on a camel?

Drinking Water

The Bedouin knew where to find the desert's oases. They dug wells to pull water from the ground. They carried the water in bags made of camel skin.

More Desert People

The Tohono O'odham and the Bedouin are just two of the world's traditional desert peoples. There are many more deserts. And there are many more desert peoples.

The Australian Aborigines, for example, walked about their continent for **millennia**. Men hunted with spears and boomerangs. Women gathered food. The Aborigines wore very little clothing. They slept by the warmth of the campfire.



Australian Aboriginal children

Nomads roamed the cold and windy Gobi Desert. They searched for vegetation for their sheep, goats, and cattle. They lived in yurts, which were like round tents.

The Atacama Indians lived in the dry Atacama Desert. They raised guinea pigs and llamas. They also planted crops.

Bushmen lived in the Kalahari Desert. Women gathered plants and roots. Men hunted animals with bows and arrows.

Deserts cover roughly one-fifth of the Earth's surface. Can you find the Sonoran Desert? The Sahara Desert?





Dressed for the desert

A Way of Life

Imagine again that you are standing alone in the desert. The sun is now shining over the mountains. The doves have found shade under a tree. You feel a bead of sweat on your forehead. What will you do on this day?

If you grew up in the desert, you would know exactly what to do. Your grandparents would have taught your parents. And your parents would have taught you. You would know how to grow vegetables. You would know which wild berries were safe to eat. You would know where to find the well or the closest spring.

For thousands of years, people have adapted to deserts. They have found food, water, shelter, and more. For these people, the desert is not just about survival. It is their way of life.

Digging Deeper

Did you find the stories of the Tohono O'odham and Bedouin interesting? Would you like to read more about them? There are many other interesting desert peoples, too. Go ahead and take a look.

1. At the Library

Tell your librarian you want to read about people who live in deserts. You could also ask for books about deserts themselves.

2. On the Web

A. In the address window, type: *www.google.com*

B. Then type: *desert people*. Click on "Google Search."

C. Read the colored links. Click on one that looks interesting.

D. When you want to explore other links, click the back arrow at the top left of the screen.

E. Or try some different searches: *Tohono O'odham, Bedouin, Sonoran Desert, Sahara Desert, or world deserts*

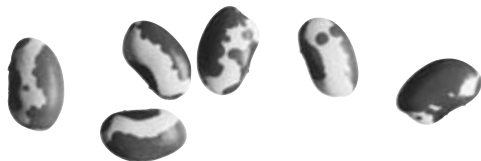
Try This

Do you think that you could grow food like the Tohono O'odham?

You probably could! Ask a teacher, parent, or friend to help you. But be careful—you might plant a seed in their head, too!

Grow Your Own Food

- 1 Find out what kinds of fruit, vegetables, and herbs grow in your area.
- 2 Decide what you want to grow, and buy the seeds.
- 3 Choose a sunny spot with soft soil. (You can also fill a pot with soil.)
- 4 Get help from someone who knows how to grow plants (or read the instructions on the seed packet).
- 5 Dig a shallow hole.
- 6 Place a seed in the hole and cover it up.
- 7 Keep the soil moist with water once a day and wait for the seed to grow!



Glossary

drought	a long period of time with very little rain (p. 12)
dung	animal manure (also known as poop) (p. 15)
millennia	thousands of years (p. 17)
nomadic	traveling from place to place without a permanent home (p. 13)
oasis	a fertile place in the desert where there is water (p. 14)
precipitation	rain, snow, sleet, or hail (p. 5)
resources	materials that people use for different purposes, including animals and plants (p. 6)
sturdy	solid and strong (p. 15)
vegetation	plants found in a certain area: desert vegetation includes bushes, cacti, and trees (p. 5)

Name _____

INSTRUCTIONS: Read *Desert People* and fill in the table. Then answer the questions below for both groups of people.

	Tohono O'odham	Bedouin
What does their name mean in English?		
What desert do they live in?		
What wild foods do they find?		
What fruits and vegetables do they grow?		
What kind of animals do they hunt?		
Where do they find water?		
Are they nomadic?		
Where do they sleep?		

Compare your answers for the Tohono O'odham and the Bedouin.

1. How were they similar? _____

2. How were they different? _____

Name _____

INSTRUCTIONS: Write each word in a sentence to show how the word forms are used.

roll _____

rolling _____

rolls _____

rolled _____

roller _____

help _____

helping _____

helps _____

helped _____

helper _____

rain _____

raining _____

rains _____

rained _____

The Yanomami: Deep in the Amazon

A Reading A-Z Level W Leveled Reader

Word Count: 1,642

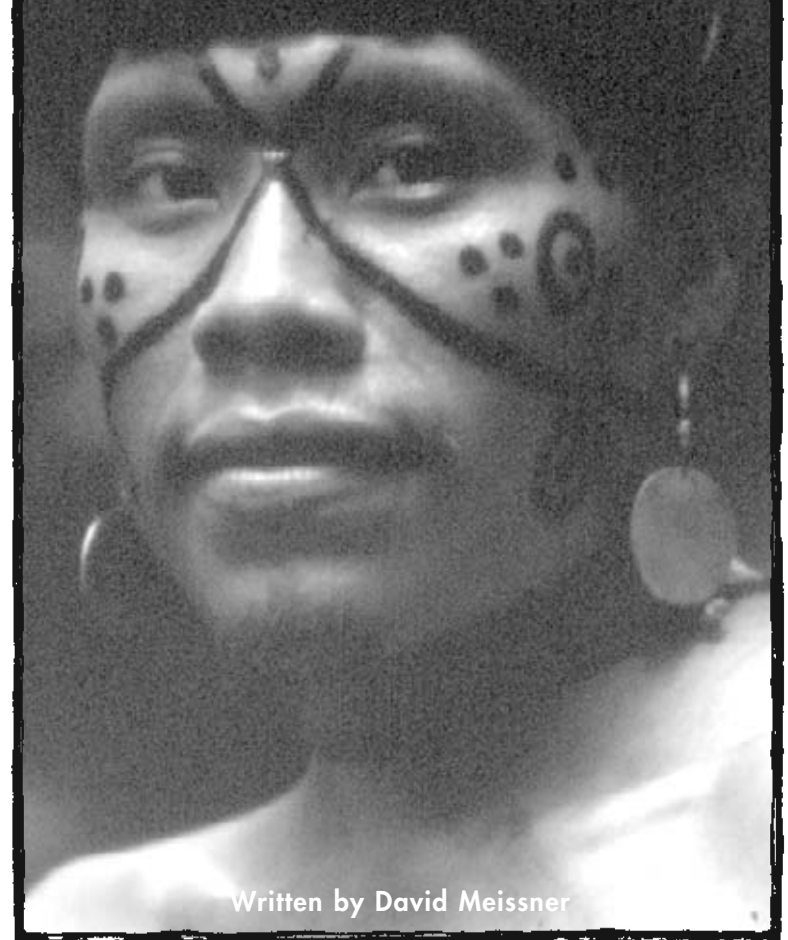


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The Yanomami Deep in the Amazon



Written by David Meissner

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The Yanomami: Deep in the Amazon

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A Different Look

What if you arrived at school one day with red stripes painted on your body? What would your friends say? What if your nose and lips were pierced with little sticks? What if you wore parrot feathers in your ears? Would people laugh at you?



Yanomami man

Well, what seems strange to one person may seem normal to another. The answers to these questions probably depend on what **culture** you grew up in. Your friends might think that

wearing red stripes, sticks, and feathers is strange. But if you grew up in certain parts of the Amazon rainforest, it would be completely normal. Your parents and grandparents would dress this way and your friends, too.

In fact, if you walked deep into the Amazon rainforest dressed like you are right now, people would probably stare at you. Things that may seem normal to you (like T-shirts, socks, and shoes) would look very strange to them.

People do wear sticks in their noses and feathers in their ears. They also walk barefoot in the jungle with bows and arrows. These people pick bananas that grow in the wild. They eat fruit, monkeys, and even insects.

These people also have lived deep in the rainforest for thousands of years. They still use local **resources** for food, shelter, and clothing. Most of them have never left the rainforest. They do not have stores, cars, electricity, or television.

They are one of the world's oldest traditional cultures. They are called the Yanomami.

In this Leveled Reader, you will learn about the Yanomami. They are an interesting group of people who may live very differently from you. You will read about where they sleep, how they find food, and how they dress. You will also learn why the Yanomami became “famous” around the world.

At Home in the Amazon

The Yanomami live in the richest part of the natural world: the Amazon rainforest. The Yanomami live in the northern part of the Amazon rainforest. Their lands are located in present-day Venezuela and Brazil, although the Yanomami have lived there long before those countries even existed.

The Amazon is home to more kinds of plants and animals than any other place on earth. The Amazon rainforest has plenty of rain, sun, and warm weather. It is full of green plants. These plants produce fruit and flowers all year. This makes great food for animals to eat. And all of these resources (water, plants, and animals) make it a place where humans can live too.



The Amazon is lush throughout the year.



Hammocks can be made out of vines, bark, and cotton.

The Yanomami are almost a part of the rainforest. They pick fruits that grow on trees. They hunt animals that live nearby. They make their homes out of wood, leaves, and vines. For thousands of years, the Amazon rainforest has given the Yanomami all that they need to survive.

Do You Know?

Yanomami can be spelled in different ways: *Yanoama*, *Yanomama*, and *Yanomamo*.



An entire Yanomami village may live under one circular roof!

Traditional Ways

The Yano

The Yanomami live in big, circular huts called *yanos*. They build them with wooden poles, vines, and thatched leaves. If you saw a *yano* from above, it would look like a big circle with a hole cut out in the middle. The center of the circle is open to the sky. This is where the adults hold ceremonies and where the children play.

An entire Yanomami village may live in the same *yano*. This means that many families share the same roof. Instead of living in separate rooms, each family has its own area where family members eat and sleep. Each family has its own fire pit for cooking. And each person has his or her own hammock to sleep in. The roof protects the Yanomami from the rain and the fire keeps them warm at night.

Gathering and Gardening

The Yanomami know the rainforest well. They know which plants are **edible**. They know which ones are poisonous. They know which herbs to use for a headache and which ones to use for a cold.

Yanomami women gather wild foods like fruit, nuts, and roots. Sometimes children climb high in the trees to pick fruit. The Yanomami even gather insects to eat, such as termites.

Yanomami villages also plant gardens in the rainforest. To make room for the garden, they cut and burn the trees on a small section of land. Then they plant sugar cane, **plantains**, sweet potatoes, **manioc**, and more. The Yanomami know that rainforest soil is thin. This is why they move their garden to a new place every few years. This way they do not harm the land. The old garden soon grows back into rainforest again.

Each Yanomami village has its own garden. Within that garden, each family has a small plot of land.



Why a Wayumi?

When the Yanomami do not have enough food from gathering and gardening, they set out on a *wayumi*. A wayumi is a **trek** through the rainforest in search of food. Entire villages travel on wayumis that may last from a few days to many weeks. On wayumis, they eat roots, make hammocks out of bark, and sleep under big leaves to keep dry.

Hunting and Fishing

Yanomami men hunt with long bows and wooden arrows. They attach bird feathers to the arrows to make them fly straight. Sometimes they dip their arrowheads in poison. Hunters walk barefoot through the rainforest. They look for anteaters, **tapirs**, and other animals. When a hunter kills an animal, he shares its meat with the entire village.

The Yanomami use different **methods** to catch fish. They may shoot arrows at fish in the river. Or they may skim baskets through the water. The Yanomami also know how to fish with the poisonous *ayori-toto* vine. They cut the vine and slide it through the water. The poison drips into the water and stuns nearby fish. The fish then float to the surface. That's when the Yanomami scoop them up.

The Yanomami hunt animals with bows and arrows.



Clothing

In the hot rainforest, the Yanomami do not wear much clothing. Men tend to wear **loincloths** and strings tied around their waists. Women wear little fringed aprons and no top. Children often don't wear any clothing. The Yanomami do not normally wear shoes or sandals.

The Yanomami paint their bodies with different colors. They use red dyes from seeds, purple dyes from palm fruit, and black powder from charcoal. They like to paint dots and squiggly lines.

Yanomami girls like to pierce their nose, lips, and ears. They insert small wooden sticks in their nose and lips. From their ears, they hang bright bird feathers. They also wear necklaces made of seeds and armbands made of fragrant leaves. The boys sometimes crown their heads with small, white hawk feathers.



(Above) The local jewelry of a Yanomami girl.

(Right) A Yanomami boy dresses up.



The Yanomami Today

About 20,000 Yanomami live in the Amazon today. They live in a way that is similar to their **ancestors**. They still hunt, gather food, and sleep under yanos.

But in the last fifty years, more and more outsiders have reached their land. These outsiders travel by motorized boats, trucks, and airplanes. The Yanomami are no longer so isolated in the rainforest.

They call these outsiders “*nabuh*.” The arrival of *nabuh* has been hard for the Yanomami. Some of them have died from new diseases introduced by the *nabuh*. Others have been killed by gold miners. But the Yanomami also feel threatened for another reason. *Nabuh* are quickly destroying their home—the Amazon rainforest.



Garimpeiros are some of the outsiders on Yanomami land.

Garimpeiro Gold Rush

In Portuguese, *garimpeiro* means “wildcat gold miner.” This is a person who usually goes out alone or with a small group of people in search of gold. In the 1970s, many *garimpeiros* invaded Yanomami land hoping to strike it rich.

Many *nabuh* who visit the Amazon rainforest take something away from it. Some take gold from the ground. Others take rubber from trees. Many outsiders cut down large sections of rainforest to take out wood.



Every day more of the Amazon rainforest is cut down.

This must seem threatening to the Yanomami because they know that if the rainforest is not healthy, they will not be healthy. If there are no trees, there will be fewer animals. And without trees and animals, the Yanomami could not exist. Their life is in a delicate balance with the rainforest. They could not survive without it.

Living for Today and Tomorrow

The Yanomami do something very special: they live in a way that is **sustainable**. This means that the way they live today will leave a healthy rainforest for tomorrow. They don’t cut down any more trees than they need. And they don’t hunt any more animals than they need. This way their children and grandchildren will still have fruit to pick and animals to hunt.



Two Yanomami boys with pet opossums on their heads

Why Does the World Care?

In the past twenty years, the Yanomami have become kind of “famous.” Their faces appear in books, magazines, and even movies. People around the world have become fascinated by their culture. But they have also been worried that the Yanomami are in danger.

Many people around the world have worked to protect the Yanomami way of life. In 1991, the government of Brazil set aside a large piece of rainforest for them. The government even blew up airstrips to keep the gold miners from landing there.

But most Yanomami do not even know that they are famous. They do not know that they are the subjects of books and movies. They just continue to live their daily lives in the rainforest—as they have done for thousands of years.

So why should we care about faraway people in such a faraway place?

Well, it’s not actually as far away as it seems. The Amazon rainforest is important to all of us on Earth. It produces a lot of the world’s oxygen. It affects a lot of the world’s weather. It is home to many unique animals. And of course, it is home to special people.



Young Yanomami man making an arrow

The Yanomami culture is probably different from yours. Chances are that you don't go to school with red stripes painted on your body. And you probably don't wear sticks in your nose. But after reading about the Yanomami, they might seem a little less strange to you.

Just as you put on a shirt, the Yanomami paint red stripes on their chests. Just as you go to school in the morning, they walk into the rainforest to find food. And just as you have learned from your parents, the Yanomami learn from their parents. So in some ways, you are not that different after all.

Explore More

Did you find the stories of the Yanomami interesting? Would you like to read more about them?

❶ At the Library

Tell your librarian you want to read about people who live in the Amazon rainforest. In addition to the Yanomami, there are many more interesting groups of people who live in the Amazon region.

❷ On the Web

- A. In the address window, type: *www.google.com*.
- B. Then type:
Yanomami. Click on "Google Search."
- C. Read the colored links. Click on one that looks interesting.
- D. When you want to explore other links, click the back arrow at the top left of the screen.
- E. Or try some different searches: *Yanomamo*, *Amazon rainforest people*, or *Brazil*.

TRY THIS!

Let's Investigate!

The Yanomami know where their food, clothes, and houses come from. Do you?

Do you know where your clothes were made? What about the very shirt on your back? Well, a person on the other side of the world may have helped to make it!

There's a pretty easy way to find out where things come from: read the label. There are labels on shirts, fruit, canned food, toys, and many more things. Labels might read: "Made in Spain" or "Made in China" or "Made in Brazil." See where the things in your house were made. If there's not a label, maybe it was made nearby. Ask somebody!

If you start to find things from all over the world, it might be fun to photocopy a world map. Then you could draw an "X" (or put a sticker) on each country where things are from. Then you would see how global your life really is.

Glossary

ancestor	a relative who lived a long time ago (p. 12)
culture	the customs and ways of a certain group of people (p. 4)
edible	able to be eaten (p. 9)
loincloth	a small piece of clothing worn around the hips (p. 11)
manioc	the starchy root of a tropical tree that is used for food (p. 9)
method	a particular way of doing something (p. 10)
plantain	a wild banana that grows in the tropics (p. 9)
sustainable	a way of using things so that they are not permanently damaged or used up (p. 14)
resources	something taken from the surroundings and used to support life, such as food, building materials, or things used to make clothing (p. 5)
tapir	a big, hoofed animal that is related to the horse and the rhinoceros (p. 10)
trek	a long journey on foot (p. 10)

Name _____

INSTRUCTIONS: Fill out the table below.

In the column labeled "Yanomami," write down where the Yanomami get each item. For the first box, ask yourself, "Where does their fruit come from?" Try to be as specific as possible. One example is given to you.

In the column labeled "You," write down where you get your fruit, fish, meat, house, clothing, and bed. Ask yourself, "Where does it come from?" In the first box, you might wonder where you get your fruit, like bananas. Do they grow in your backyard? Do they grow in the store? There might be a label to tell you where they are from. (Hint: See the "Try This!" section on page 19 for help.)

	Yanomami	You
Fruit		
Fish		
Meat		
House	The rainforest: vines, leaves, and trees	
Clothing		
Bed		

Bonus Question:

Looking at the completed table, what is the biggest difference that you see between the two columns?

Name _____

INSTRUCTIONS: Follow the instructions in each section below.

A. Compound Words

Make as many compound words as you can by adding other words to the end of these common base words. The first one is done for you.

bird	birdseed, _____
some	_____
air	_____
every	_____
out	_____
sea	_____

THE YANOMAMI • LEVEL W • 2

B. Synonyms and Antonyms

Write a synonym and an antonym for each of these words:

	Synonym	Antonym
deep	_____	_____
famous	_____	_____
richest	_____	_____
great	_____	_____
survive	_____	_____
circular	_____	_____
separate	_____	_____

SKILL: COMPOUND WORDS, SYNONYMS AND ANTONYMS

Pirates and Privateers

A Reading A-Z Level W Leveled Reader

Word Count: 1,898




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Pirates and Privateers



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Life on a Pirate Ship	12
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Bartholomew Roberts's ships off the African coast (including eleven captured merchant ships)

Introduction

What do you think of when you think of pirates? Buried treasure? Ships with mighty sails? Black flags with a skull and crossbones?

Have you ever wondered what it was like to be a pirate? Pirates seemed to love adventure. They were often vicious men and women who were robbers and murderers. Pirates sometimes are **glamorized** in movies and books. But they were scoundrels, and the lives they lived were not that pleasant. Their lifestyles often resulted in great discomfort and even death.

The “Golden Age” of Pirates

Throughout history, pirates have sailed the seas all over the world. From the 1500s to the 1700s, many famous pirates raided ships and ports in the Caribbean Sea. This was called the “Golden Age” of pirates.



The Caribbean Sea and surrounding area



Privateer Henry Morgan makes an assault on the Venezuelan settlement of Gibraltar with his crew of buccaneers in 1669.

During the “Golden Age,” Spain colonized large parts of Central and South America. The Spaniards were very interested in the spices, gold, and silver found in the Americas. In order to get these treasures, they forced the native people to work in mines and to gather spices. They also stole gold and silver from the native people.

The English and French royalty learned that Spain was getting rich from gold, silver, and spices from the Americas. They wanted gold for their empires, too. At the same time, there were a lot of unemployed sailors. The sailors were looking for adventure and a chance to get rich.

The Queen of England developed a plan to get some of the wealth the Spanish were bringing across the Atlantic Ocean on their ships. Her plan called for hiring unemployed sailors and providing them with ships to attack the Spanish ships. In England, these sailors were called **privateers**. In Spain, they were called pirates.

Many of the ships leaving the Americas loaded with riches passed through the Caribbean Sea. Since the Caribbean was full of small islands, it was a perfect place for pirates to hang out. It was also a perfect place from which to **launch** attacks on Spanish ships passing among the islands.



Sir Francis Drake, privateer for the Queen of England, captures the port city of Cartagena, Colombia.



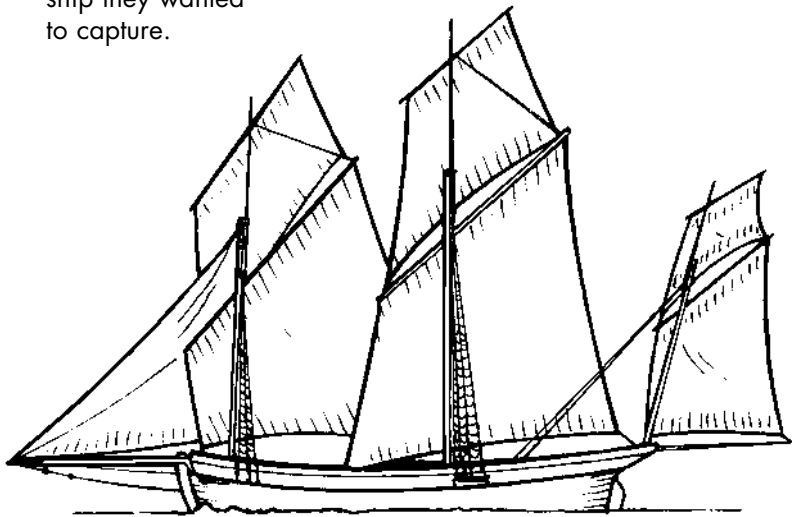
Thomas Cavendish repels a native attack.

Pirates Attack!

Pirates quickly gained a reputation of being ruthless villains. Sailors on other ships were filled with fear when they saw a pirate ship approaching. They had heard tales of pirates and their nasty deeds. Most of the ships being attacked were cargo ships that lacked weapons for fighting off the pirates. The sailors knew there was little they could do to stop the pirates.

Some pirates used smaller and swifter boats for night attacks. They would come alongside a cargo ship in the darkness of night. Then they would quickly seize the ship and kill many of the unsuspecting crew.

Pirates favored small, fast ships such as sloops, which could easily overtake any ship they wanted to capture.



Before they boarded a ship, pirates fired a warning shot from a cannon. They hoped that the captain and crew of the ship would simply give up their cargo without a fight. Cannon shots were also used to destroy masts and rigging on the other ship. Pirates then threw smoke bombs onto the ship's deck to confuse and frighten the crew. The pirates then used **grappling hooks** to climb aboard the ship.



Roche Brasiliano holds a cutlass.

Once on board, pirates used many kinds of weapons to take over a ship. One of the most common weapons was a **cutlass**. A cutlass is similar to a small sword. It was used for close-up, hand-to-hand fighting. Pirates also used guns, such as flintlock pistols

and flintlock muskets. The muskets fired balls made of lead. The balls were loaded into the barrel one at a time and shot out with exploding gunpowder. Sometimes pirates made crude grenades that they used in their attacks.

Many people were wounded or killed in pirate battles. Sometimes, pirates would take hostages. They might even force members of a ship's crew to join the pirate crew. Usually, pirates would simply tie up crew and passengers and then take anything of value to their ship. On occasion, pirates attacking in small boats would hijack the entire ship. These ships were then used to attack other ships.

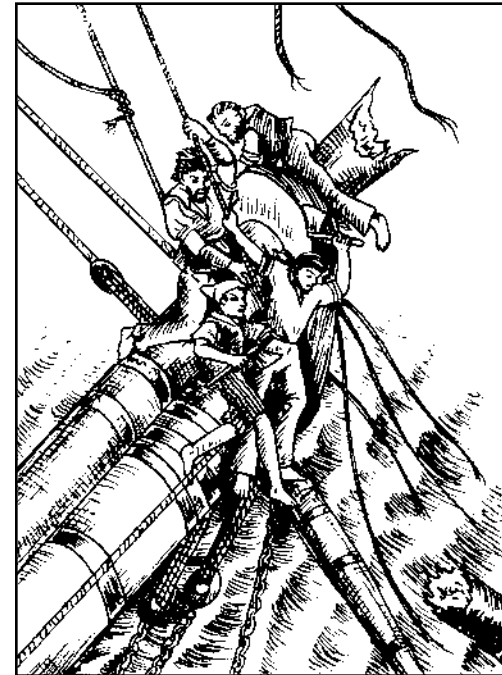
Life on a Pirate Ship

To some people, a pirate's life may seem exciting. But a pirate's life was not very glamorous. They were criminals who were hated as much as they were feared. They had to constantly be on guard and often couldn't even trust their fellow crew members. The work was hard and dangerous. Many pirates lost legs, arms, fingers, eyes, and even their lives in fierce battles. Living conditions were not very pleasant, either. They often lived in dirty, smelly quarters.

A listing of pirate booty sold to a sympathetic governor

1	To 16 barrels of beer at 60 th per barrel	0960
2	To 10 barrels of wine at 60 th per barrel	0600
3	To 2 pipes of wine 100 a pipe	0200
4	To 70 gallons of wine	0350
5	To 200 gallons of rum at 10 th per gallon	0200
6	To 10 barrels of salt at 15 th per barrel	0150
7	To 10 barrels of powder at 20 th per barrel	0200
8	To 10 dozen of black hatted knives 5 th each	0500
9	To 12 sheath knives at 1 st per knife	0012
10	To 5 dozen of thumbtacks	0005
11	To 20 dozen of razors 1 st a pair	0200
12	To 6 hundred of thread	0030
13	To 4 of a pound ditto	0004
14	To 5 pounds coloured thread	0005
15	To 6 dozen of horn combs	0072
16	To 2 dozen of ivory combs 2 nd of 10	0200
17	To 2 pairs hatters drawers	0010
18	To 5000 needles	0100
19	To 12 all blades	0002
20	To 2 gross of buttons	0050
21	To 1 dozen tobacco boxes 2 nd a box	0026
22	To 2 reams of paper	0002
23	To 100 pairs of pumps 2 nd a pair	0200
24	To 100 hatchets	0000
25	To 19 hundred of sugar 15 th per hundred	0285
26	To 3 hatts 10 th per hatt	0030
		0514

It was the love of gold that caused most pirates—and the queens and kings who hired them—to steal. But pirates stole many other items of value. The ships that were attacked often carried silver and precious gems, such as emeralds and pearls. They also carried tobacco, wine, brandy, coffee, tea, spices, and expensive fabrics like velvet and linen. Pirates sold or traded most of these goods. They also kept some for their personal use.



During a violent storm in the Caribbean, the mast of a ship would sometimes snap. The crew would have to climb into the dangerous rigging to cut the broken masts free so they would not capsize the ship.

One of the many specialized jobs on a pirate ship was making and mending sails. The sailmaker also made and mended flags.



Pirates on a ship were assigned different jobs. One person was always assigned to stand watch. This person would cling to rope ladders high above the deck to look for enemies or ships to raid. Another person, called a **helmsman**, steered the ship with a lever called a tiller.

The **cooper** was the person who made, repaired, and sealed all of the barrels on the ship. Most of the food and drink was stored in barrels. The cooper had to make sure the barrels were well-made and sealed. Otherwise, the food or drink might go bad.

There were other jobs, too, like mending the sails, cooking for the crew, **caulking** the wooden deck planks, and pumping water from the bottom of the ship.

But when the work was done, pirates had time for eating, drinking, and entertainment. They ate meals together and drank liquor or wine. They played games like dice or cards. They also played musical instruments, sang, and danced. Pirates were often lively and **rowdy** at mealtimes.

Like all sailors, pirates lived in close spaces with little privacy. They slept in hammocks. Their personal belongings, like shaving kits and clothing, were stored in sea chests.



Pirates celebrating



Captain Edward England

Pirates often stole clothes from people on other ships. The crew dressed differently than the captain. They needed comfortable and practical clothes. A typical pirate wore simple shoes and pants, plus a waist sash and a jacket with wood or bone buttons. Crew members often wore scarves over their heads.

The captain usually wore much fancier clothing. Some captains liked to wear silk pants and shirts with lace cuffs and gold buttons. They often wore shoes with silver buckles. Many pirate captains grew their hair long. They liked to tie it with ribbon to make it look like a gentleman's wig.

Not all pirates were men. There were a few women pirates, as well. Most pirate ships did not allow women on board, so women pirates had to disguise themselves by dressing like men.

Many pirate ship crews had a voice in the running of their ship. They voted on rules and helped decide how the treasure from raids would be divided. Of course, the captain always got the biggest share. Other shares were divided by the importance of a crew member's responsibilities. In some cases, crew members even elected the captain of their ship.



Mary Reade runs an opponent through.

Well-known Pirates

Many pirates became well known. And many stories of these pirates have been passed down over the years. Let's look at some of the better-known pirates and the lives they led.

Blackbeard, whose real name was Edward Teach, was a notorious pirate born in England. He first served as a crew member on a pirate ship captained by a pirate named Benjamin Hornigold. They attacked ships and port towns in the Caribbean. During that time, Blackbeard gained a reputation as a fierce fighter. Eventually Blackbeard went on to captain his own ship.

Blackbeard became one of the most feared pirate captains sailing the Caribbean. Rather than wait for his victims to take off their rings and give them to him, Blackbeard would cut off their fingers. He would place burning, smoking flares in his beard. Black smoke would rise around his face, causing people to think he was mad or crazy. That made him even scarier.



Blackbeard

In 1718, Blackbeard and his crew sailed up the Atlantic coast of America and into North Carolina. At that time, North Carolina was part of the British colony. Blackbeard sailed up coastal rivers and raided wealthy plantations.

People were scared and angry. They wanted to get rid of Blackbeard and his pirates. They asked the British Navy for help. A British Navy captain and his crew fought a fierce battle with Blackbeard and his crew. Blackbeard lost his life in that battle. According to legend, it took 20 cutlass wounds and five shots to kill him.



Robert Maynard fighting Blackbeard

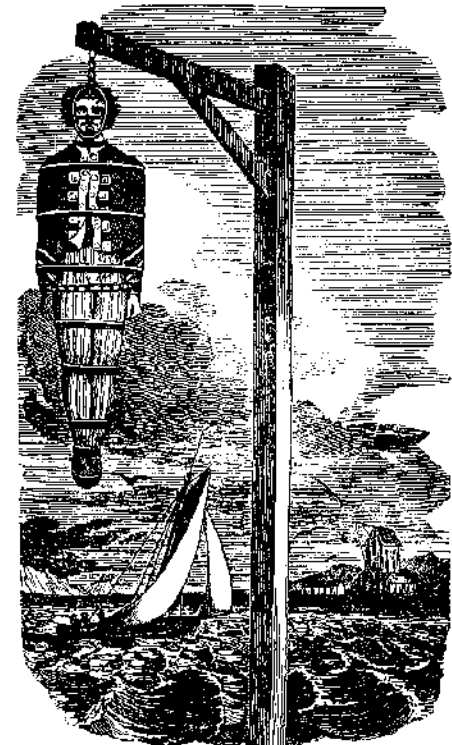
Anne Bonny was one of a few women pirates. She was born in Ireland. She moved to South Carolina with her family when she was a young girl. Her father was a lawyer, and her mother was a **maidservant**. Anne fell in love with a sailor and ran away with him to New Providence, in the Bahamas. Then she met the pirate Calico Jack and joined his pirate crew.

She disguised herself as a man and was a tough fighter. Most people did not know she was a woman. She raided ships with Calico Jack until 1720. They were eventually captured by the British Navy and were tried in a court in Jamaica. The judge first sentenced Anne to death by hanging. But before the hanging, the Navy learned that she was pregnant. Her sentence was then changed to life in prison.



Anne Bonny

Pegleg is another well-known pirate. He worked as a privateer for a French king. He is best known for his “wooden leg.” But Pegleg, whose real name was François le Clerk, did not have a wooden leg. Instead, he used a wooden crutch after losing his leg in a battle. Pirates with wooden legs are often popularized in movies and books, such as *Treasure Island*, probably because of Pegleg.



Captain Kidd's corpse
on display as a
warning to others

Do You Know?

Captain Kidd was another famous English pirate. When he was finally captured and put to death, the authorities ordered his body to be hung by the harbor for all to see. This was done to discourage others from becoming pirates.

Another privateer was Sir Francis Drake, an Englishman. He started sailing when he was just 14. He first sailed with his cousin John Hawkins, who took slaves from Africa to the Americas.

Sir Francis began to captain his own ship in 1570. He attacked Spanish ships, stealing large amounts of treasure for Queen Elizabeth of England.

Sir Francis did not limit his pirating activity to the sea. When he learned that the Spanish were taking more riches from mines in Panama by mule train, he went inland and attacked the mule trains. He even captured the town in the center of the mining region. Sir Francis Drake became a rich and successful pirate by attacking ships and mule trains. Queen Elizabeth rewarded Drake for capturing so much treasure for England by making him a knight.



Sir Francis Drake



The captain of a ship taken by pirates often met a cruel fate.

Conclusion

During the Golden Age of piracy, no ship was safe on the sea. The Caribbean Sea was one of the most notorious hangouts for pirates. But pirates sailed the seas in other parts of the world as well.

Pirates were often lawless, vicious men and women who made their living by stealing and robbing. Other pirates were ex-sailors hired by kings and queens who were greedy and wanted more wealth.

Modern-day pirates still roam the seas of the world. But rather than sailing slow wooden sailboats, they have high-powered speedboats. They attack small pleasure boats and ships. They steal valuables that they can then sell on the **black market**.

Explore More

On the Web:

- 1 In the address window, type: *www.google.com*
- 2 Then type: *pirates*. Click on “Google Search.”
 - Read the colored links. Click on one that looks interesting.
 - When you want to explore other links, click the “back” arrow on the top left until you get back to the page with the links that Google found.
 - Then try a search using other words from this Leveled Reader, such as *privateers*, *pirate ships*, *pirate flags*, and *Blackbeard*.

In searching for *pirates* on the Web, you will quickly discover that there are many links to the Pittsburgh Pirates, an American baseball team. To avoid these links, do the following:

- 1 In the address window, type: *www.google.com*
- 2 Click on Google’s “Advanced Search” link.
 - After “With all of the words,” type *pirates*.
 - After “Without the words,” type *baseball* and *Pittsburgh*. Then click “Google Search.”

This will help you to access links that are about the kind of pirates in this Leveled Reader.

Glossary

black market	an illegal trade network (p. 22)
caulking	filling gaps and cracks with a watertight sealant (p. 13)
cooper	a barrelmaker (p. 13)
cutlass	a short, curved sword (p. 10)
glamorized	artificially made more fascinating and attractive (p. 4)
grappling hook	an anchor with several hooks, attached to a sturdy rope (p. 9)
helmsman	the person who steers the ship (p. 13)
launch	to start or set in operation (p. 7)
maidservant	a female who does household work. A male who does this kind of work is called a manservant. (p. 19)
privateer	an independent pirate operating with a license from a king or queen (p. 7)
rowdy	rough, loud, excitable, quarrelsome, or aggressive (p. 14)

Name _____

INSTRUCTIONS: Look over the KWL chart below before reading the story and fill in the first two columns.
Read the story once and then reread it, filling in the information as you go.

	What I ...	
Know already	Want to know	Learned from reading the story

Name _____

INSTRUCTIONS: Choose five words from the glossary and write them on the lines next to the numbers.
Next, write their definitions in your own words, using complete sentences.

1. _____

2. _____

3. _____

4. _____

5. _____

Mummies

A Reading A-Z Level W Leveled Reader

Word Count: 1,667




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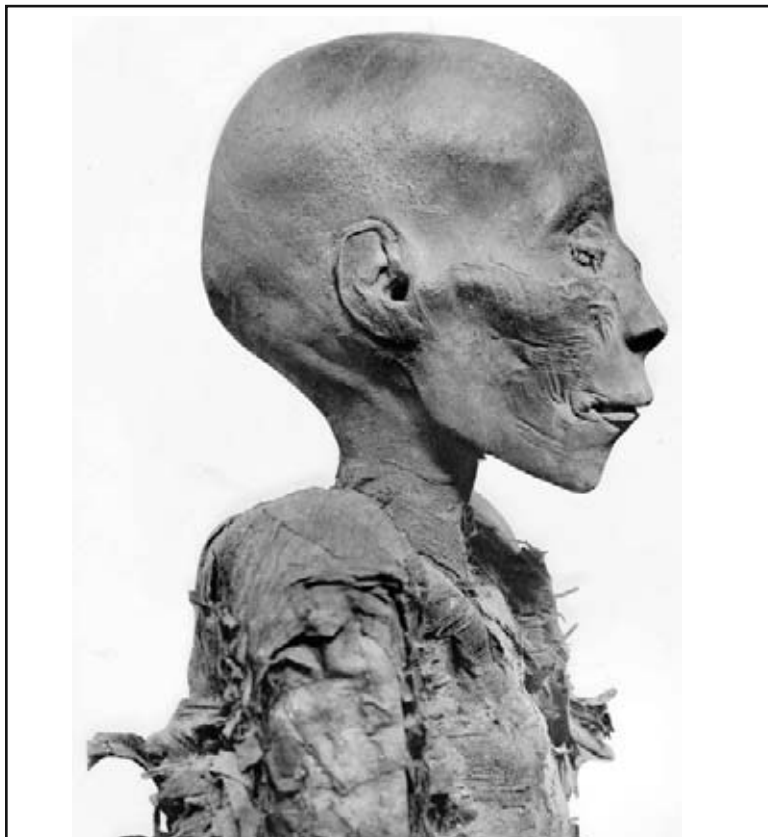
MUMMIES



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A cemetery

INTRODUCTION

In modern countries around the world, including Egypt, people are often buried in coffins after they die. Sometimes the body is **cremated**, and the ashes are either kept by loved ones or spread over an area that the person enjoyed, such as the ocean. But this is not the way it has always been. The ancient Egyptians turned their dead into mummies.

The ancient Egyptians are famous for making mummies. They **mummified** everyone from kings to pets by drying the bodies, rubbing them with spices, and wrapping them in strips of cloth. However, the Egyptians are not the only people that mummified their dead. There is evidence of mummification in many places around the world.

WHAT ARE MUMMIES?

A mummy is a preserved corpse. Normally, a dead body decays very quickly. Bacteria in the air start **decomposing** body cells immediately after death. If the body is left alone, scavengers and pests, like vultures and flies, devour the corpse. In a mummy, the decay process is **arrested**, and the dead body is preserved for thousands of years.

The first mummification occurred naturally, in areas that were too dry or cold for bacteria to grow. The body was preserved without human interference. Later on, people developed ways to preserve mummies artificially.



This early Egyptian burial is an example of natural mummification.



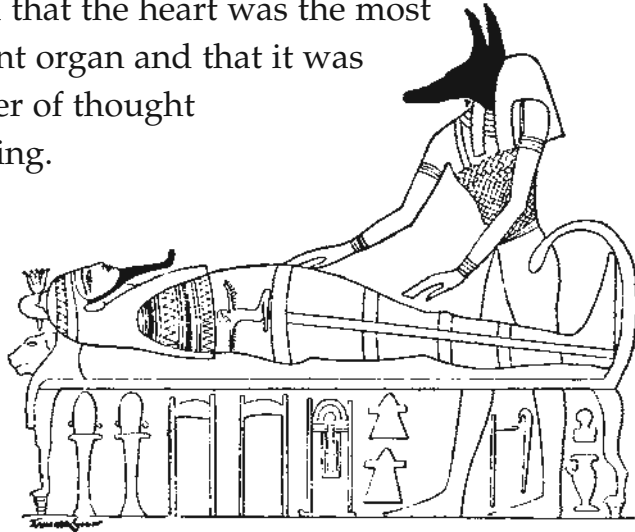
An early Egyptian coffin showing a decomposed corpse and no mummification

MUMMIFICATION

The first Egyptian mummies were buried in the hot desert sand. It was so dry that the bodies dried out almost immediately, preserving them from decay. These dried mummies looked a lot like beef jerky. Their flesh became tough and hard.

Unfortunately, unprotected bodies buried in the desert were often eaten by jackals, which love the taste of “human jerky.” Egyptians tried to protect their buried ancestors by covering the burial site with rocks. Wealthier Egyptians buried family members in painted coffins. But the coffins, which kept out the jackals, also kept out the hot sand, and the bodies inside decayed.

Resourceful Egyptians developed ways to preserve the bodies before burial. When someone died, the body was given to a team of **embalmers**. First, the embalmers laid the body face up on a six-foot-wide embalming table. Their first job was to remove all the soft organs that encouraged the growth of bacteria. They carefully pulled the brain out through the nose with an **embalming hook**, making sure not to deform the person's face. The brain was not very important to the ancient Egyptians. They believed that the heart was the most important organ and that it was the center of thought and feeling.



DO YOU KNOW?

The Egyptians believed that the first mummy was the god Osiris. He was murdered by his brother Set and cut into pieces. His wife, Isis, put him together with magic, and his jackal-headed nephew, Anubis, embalmed him. Osiris then became the god of the dead and the underworld.

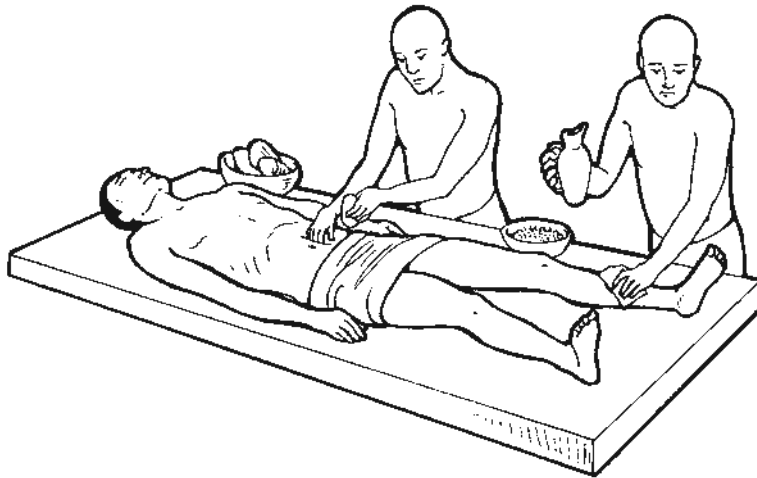
The chief embalmer cut an **incision** in the left side of the stomach. From this hole, the embalming team pulled out all the internal organs except the heart and placed them to the side. The stomach, liver, lungs, and intestines were preserved individually in special jars called **canopic jars**. These organs accompanied the body during burial but were not as important as the heart. The heart was preserved inside the body.

Embalmers washed the body, inside and out, with palm wine. The alcohol in wine killed bacteria. By this time, the body had probably begun to stink, a sign of decay. So the embalmers filled the body with bags of sweet-smelling spices mixed with **natron**, a special salt. Then they covered up the body and internal organs with more natron and left them alone for 40 days.



Canopic jars had decorative lids that represented minor gods who protected the contents of the jars.

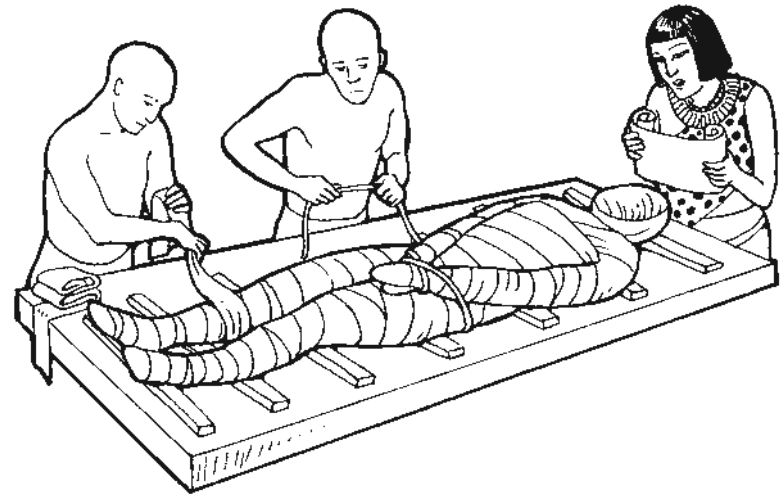
The whole mummification process took 70 days. Once the drying process had been completed, the embalmers removed the salt. The mummy became very light, since all the water—which made up over 65 percent of the body’s weight—had been removed. The embalmers filled the inside of a corpse with linen stuffing, producing a body that appeared strong and healthy instead of **shriveled**. Then they rubbed the corpse with more spices, mixed with wax and oil, to make it smell sweet. Next, a sticky **resin** made of tree sap was poured over the body. When the resin hardened, it formed a thin, protective shell around the body. This shell protected the mummy from bacteria and caused it to become darker in color.



The body is stuffed and then rubbed with spices and oils.

Embalmers often applied makeup to the mummy’s face to make it look more alive. They also placed jewelry on a rich person’s corpse before wrapping it up. The resin-soaked wrap consisted of linen bandages the length of a football field. The wrap helped to preserve the shape of the body.

The best linen was saved for the outermost layer of bandages. Cheap linen was used on the inside, where it couldn’t be seen. Magical charms and **talismans** meant to ensure the mummy’s safety in the realm of the dead were put between the layers of bandages. These talismans were carved out of precious stones. Talismans are small objects **instilled** with magical protections.



A priest reads spells as the mummy is wrapped. A papyrus scroll with spells from the *Book of the Dead* is put between the hands.

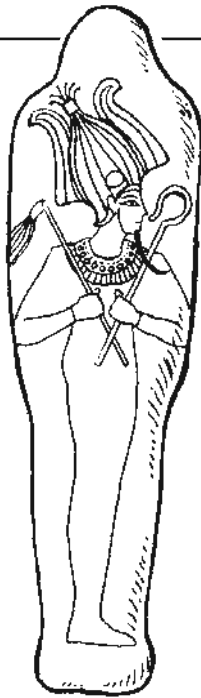
THE STEPS OF MUMMIFICATION

- ❶ Place the body on a large table, facing up.
- ❷ Remove internal organs through a cut in the abdomen.
- ❸ Wash the body with palm wine.
- ❹ Dry the body by covering it with piles of salt.
- ❺ Remove the salt, and rub the body with sweet herbs.
- ❻ Stuff the body with linen and bags of spices.
- ❼ Cover the body with resin.
- ❽ Apply makeup and jewelry.
- ❾ Wrap the body in bandages.

After the body is wrapped in linen bandages, a cloth is wrapped around the entire body. On the cloth is painted a picture of the god Osiris.

DO YOU KNOW?

In the Middle Ages, doctors in Europe prescribed mummy powder, made from ground-up mummies. They thought that mummy dust would cure sick people, but it usually only made them sicker.



A page from the *Book of the Dead* from Thebes, Egypt, written around 1300 B.C.

THE AFTERLIFE

The ancient Egyptians believed that **immortality** depended on having a well-preserved body. They believed that a dead person split up at the moment of death into several parts: the **ba**, the **ka**, and the physical body. The **ka** was a person's ghostly identical twin. It lived inside the mummified heart and could not move from the tomb. The **ba**, which represented the personality and spirit of a person, was a human-headed bird that could fly around freely by day. The **ba** and the **ka** joined to form the **akh**, a person's soul.

According to ancient Egyptian belief, a dead person's soul traveled through the dangerous realm of the dead to a special palace of judgment, called Osiris's palace. Along the way, the soul dodged monstrous snakes and crocodiles while crossing huge rivers of fire. Osiris, the god of the dead, judged everyone by weighing their hearts on a scale. If a person's heart was heavy with sin, it was thrown to the hungry monster beneath the scales. That person would die permanently. But if the heart was lighter than a feather, then the dead person would live forever—or be immortal—in the world of Osiris.

When the Egyptians first began to make mummies, only very rich or important people were mummified. They believed that only pharaohs and nobles deserved an **afterlife**.



A painting of a soul being judged as worthy by Osiris.

However, as the embalming process became easier and the Egyptians became richer, more people were mummified. The Egyptians eventually believed that everyone deserved to have a chance at immortality.

Since the Egyptians believed that the afterlife was exactly like life, they buried mummies with their favorite objects and tools. Wealthy nobles were buried with gold and gems. Children were buried with their favorite toys. Everyone was buried with clay representations of food and drink, and with clay figurines called **shabtis**—servants who would work for them in the afterlife.



A collection of shabtis

THE BURIAL

Mummies were laid to rest in decorated coffins usually made of **papier-mâché** and beaten gold. Richer people were buried in a sarcophagus made of stone or a coffin of imported wood.



Pharaohs were buried in up to four gold-covered coffins nested inside each other.

The coffins were painted with a representation of the person's face so that the ba could find the right tomb when it returned at night.

Hieroglyphs, painted or chiseled onto the coffin, told the story of the person's life. These inscriptions also held spells to keep the dead person safe in the underworld.

Inner coffin of Shepenmehyt, from Qurna, Thebes, Egypt, around 600 B.C.



Superstitions were common in Egypt. Most people believed that mummies would curse anyone who disturbed their tomb and stole from the dead. But **tempted** by the treasures buried with the mummies, thieves broke into even the best-guarded tombs. They often tore the mummies apart, looking for the gold and gems under the bandages. They were willing to risk death and punishment for riches. Most tombs were robbed within a few years of their burials.

This mummy was damaged by thieves looking for souvenirs.



Archaeologist Howard Carter (left) examines the coffin of King Tutankhamen, which he discovered in 1922.

THE TOMB OF TUTANKHAMEN

The Pharaoh Tutankhamen, also called the Boy King, died when he was only 18. We know very little about his life or his rule in Egypt, but he is the most famous mummy in the world.

Tutankhamen's tomb was opened in 1923. Even though it had been robbed twice in ancient times, King Tut's tomb still held great treasures. The thieves had entered the second room, which was filled with Tut's gold chariots and statues. They stole about a sixth of the tomb's gold but were probably interrupted before they could finish. King Tut's mummy had not been touched.

King Tut was buried in a series of three coffins, one inside the other. The first two coffins were made of wood covered in bands of gold. But the innermost coffin was made of solid gold and covered with gems. Tut's beautiful burial mask was also made of pure gold. Heavy jeweled

bracelets encircled his wrists, and golden **amulets** and necklaces were draped around his neck.



Riches from the tomb of King Tutankhamen

DO YOU KNOW?

The Egyptians stopped making mummies around A.D. 400. By this time, most Egyptians had converted to Christianity. They no longer believed that the dead person needed to be mummified in order to experience eternal life.

ANIMAL MUMMIES

The ancient Egyptians mummified animals as well as people. Cats were especially **sacred** to the Egyptians. They represented Bast, the cat-headed goddess of happiness. Cats were kept as pets, and when one died, the whole family shaved their heads and eyebrows in mourning. Cat mummies were buried with their owners or at the temples of Bast.

Ancient Egyptians also mummified other animals sacred to the gods, such as crocodiles, ibises, and falcons. These animals were sent to the afterlife as offerings to the gods.



Mummy of a cat from Abydos, Upper Egypt, Roman Period, around 1st century A.D.

CONCLUSION

Natural mummies have been found around the world. They can be found in the cold, acidic water of a marsh in Denmark, in the frozen depths of an Alpine glacier, or in the hot sands of a desert.



The dead have been preserved as mummies by many different cultures, from Buddhist monks in Japan to tribesmen in Papua New Guinea. The Incas in Peru, half a world away from the ancient Egyptians, mummified their ancestors in much the same way as the Egyptians. While artificial and natural mummification vary in some ways, they are alike in one important way. All mummification results in the arrest of cell decay, which preserves the body for hundreds, if not thousands, of years.

The mummy of Ramses III, from the 1100s B.C., was discovered in 1871. It is now in the Cairo Museum.

We can learn much about ancient civilizations by studying mummies and the contents of their tombs. Scientists around the world study mummies in order to know more about how ancient people lived and died.

This mummy of a warrior and village chief is from Indonesia. It is blackened by smoke and is about 400 years old.



Where Mummies Have Been Found

AFRICA	ASIA	SOUTH AMERICA
Egypt	Japan (Honshu)	Peru
Nubia	China	
	Siberia	EUROPE
SOUTH PACIFIC	Indonesia	Alps (Italy/Austria)
Australia		Denmark
New Zealand	NORTH AMERICA	Southern Italy
Papua New Guinea	Northern Canada	Greenland
	Southwestern U.S.	
	Mexico	

TRY THIS

Make your own mummies!



- 1 Cut an apple into twelve wedges.
- 2 Put half the wedges skin-side down on a baking sheet.
- 3 Bake in an oven on low heat for an hour or until dry. Low heat is about 100° Celsius (260°F). You could also put the apple wedges in a warm, dry place in the sun for several days.
- 4 Remove the apple wedges after they have dried out.
- 5 Place them next to the six apple wedges that have not been dried.
- 6 Notice the differences between the two groups of wedges after several days inside at room temperature.

GLOSSARY

afterlife	the realm of life after death (p. 13)
akh	the soul and essence of a person, combining the personality and the ghostly form (p. 12)
amulets	a charm worn on the body for protection against injury or evil (p. 18)
arrested	stopped (p. 5)
ba	the human-headed bird made out of a person's personality after their death (p. 12)
canopic jars	the jars holding the mummy's internal organs (p. 8)
cremated	a funeral method involving burning the corpse to ash (p. 4)
decomposing	rotting; decaying; falling apart (p. 5)
embalmers	people who preserved corpses (p. 7)
embalming hook	an embalming tool used to remove the brains from mummies (p. 7)
hieroglyphs	ancient Egyptian picture writing, using symbols for syllables (p. 15)
immortality	living forever (p. 12)

incision	a deep cut (p. 8)
instilled	filled with (p. 10)
ka	the dead person's ghostly twin (p. 12)
mummified	having been made into a mummy (p. 4)
natron	a special salt used to dry mummies, similar to baking soda (p. 8)
papier-mâché	a cardboard-like material, formed out of wet paper pulp, then dried; used to make mummies' coffins (p. 15)
resin	a fragrant, sticky substance made from tree sap (p. 9)
sacred	holy; belonging to a deity or connected to a religion (p. 19)
shabtis	carved figurines that awoke as servants of the dead in the afterlife (p. 14)
shriveled	dried up and wrinkled (p. 9)
talismans	magical objects that held protective spells and prayers (p. 10)
tempted	strongly attracted, or driven by desire for something illegal and/or pleasurable (p. 16)

Name _____

INSTRUCTIONS: After reading *Mummies* and the following paragraph about King Tut's burial tomb, fill out the following table with King Tut's favorites—and your favorites, too. Finally, answer the questions below the table.

King Tut's tomb was filled with objects from his life as well as golden treasures. Like most wealthy Egyptians, he could afford to eat meats, like roasted duck, pigeon, and goose, and sweets, like nut and honey cakes. He was buried with his favorite toys, including a board game, spinning tops, and a bow-and-arrow set. He had hunting dogs as pets, and a statue of an Ibizan hound was found in his tomb.

	King Tut's favorites	My favorites
Favorite toys		
Favorite foods		
Favorite drinks		
Favorite pet		
Favorite figure/doll		
Favorite jewelry		

Why was it important for King Tut to have all his favorite things in his tomb? Are your favorite things really important to you?

Name _____

INSTRUCTIONS: Fill in the answers for each section below.

A. Adjectives

Write adjectives to describe the following nouns:

_____ mummy	_____ necklace	_____ spears
_____ resin	_____ sarcophagus	_____ mask

B. Adverbs

Write adverbs to describe the following verbs:

_____ protected	_____ threw	_____ dodged
_____ flew	_____ dried	_____ broke

C. Multiple Word Definitions

Some words have multiple meanings. For instance, *bright* means both "very smart" and "shining with light." For each of the words below, write down two of the most commonly used meanings. Then explain what those meanings have in common. Use a dictionary if you need help.

arrested _____

monstrous _____

terminal _____

alert _____

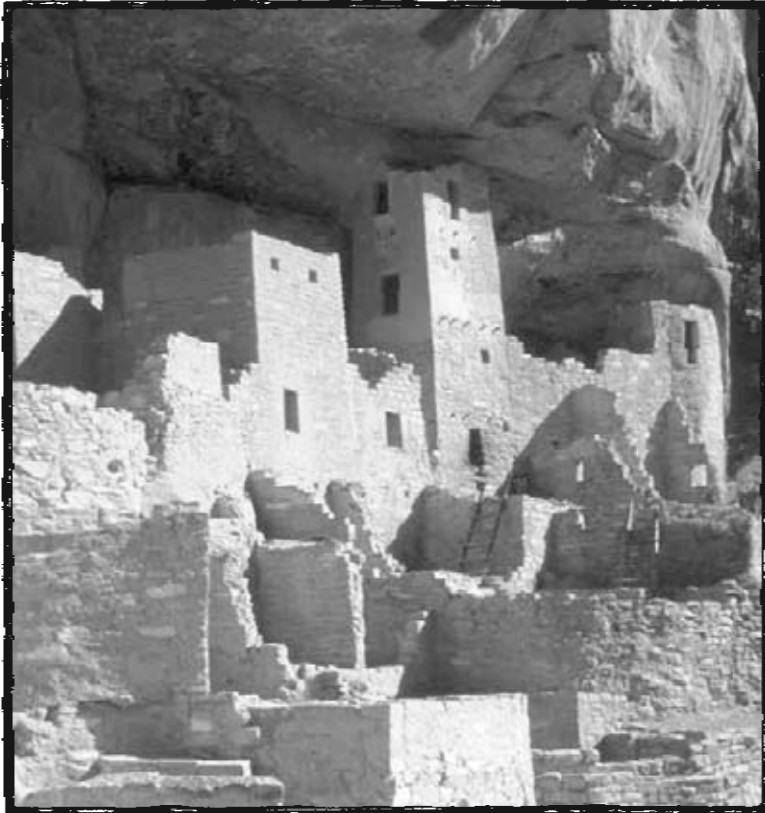
grate _____

preserves _____

Discovery in the Americas?

A Reading A-Z Level W Leveled Reader

Word Count: 1,609

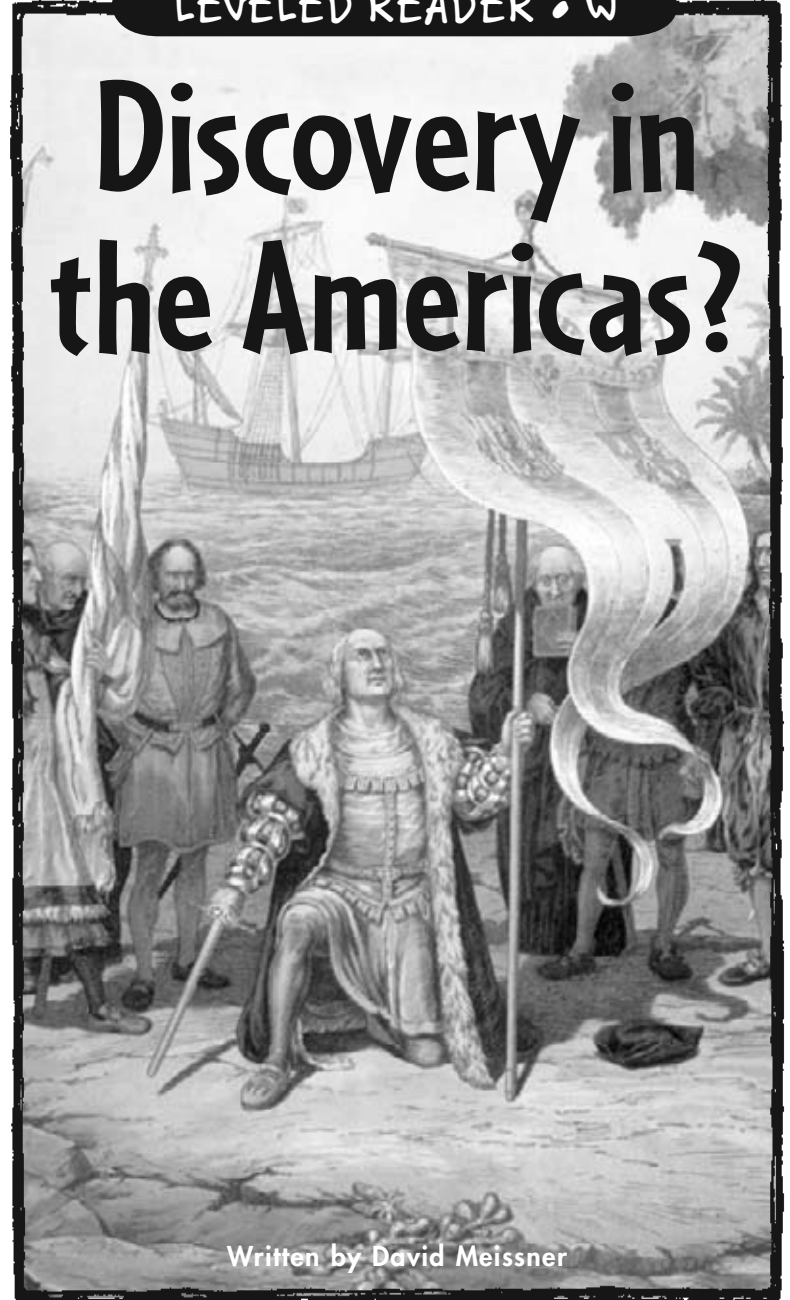


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Front cover: A European painting of Columbus's arrival in the Americas

Back cover: Anasazi ruins at Cliff Palace, Colorado

Discovery in the Americas?
Level W Leveled Reader
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Written by David Meissner
Maps by Fred Volke
Illustration by Maria Voris

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Note: There are four maps in this Leveled Reader. They use names like “North America” and “Colorado” even though those places didn’t have those names when the events in this book occurred. The modern names are used so that you can use modern maps to see where things were a long time ago.

CHAPTER 1: Christopher Columbus



Christopher Columbus was an Italian explorer.

In 1492, Columbus sailed the ocean blue.

This is a famous rhyme about a famous voyage. On August 3, 1492, Christopher Columbus set sail from Europe with a group of three ships. He was looking for a shortcut to a group of islands in Southeast Asia called the Indies. That’s why he tried to sail west across the Atlantic Ocean.

Columbus didn’t realize that large continents would block his way. He and his crew spotted land on October 12. They thought it was the Indies.

Do You Know?

Have you ever wondered where the word “America” comes from? America is actually named after the Italian explorer Amerigo Vespucci. He explored the American mainland in 1497. Then a German mapmaker labeled the land “America.” Ever since then, the name has stuck.

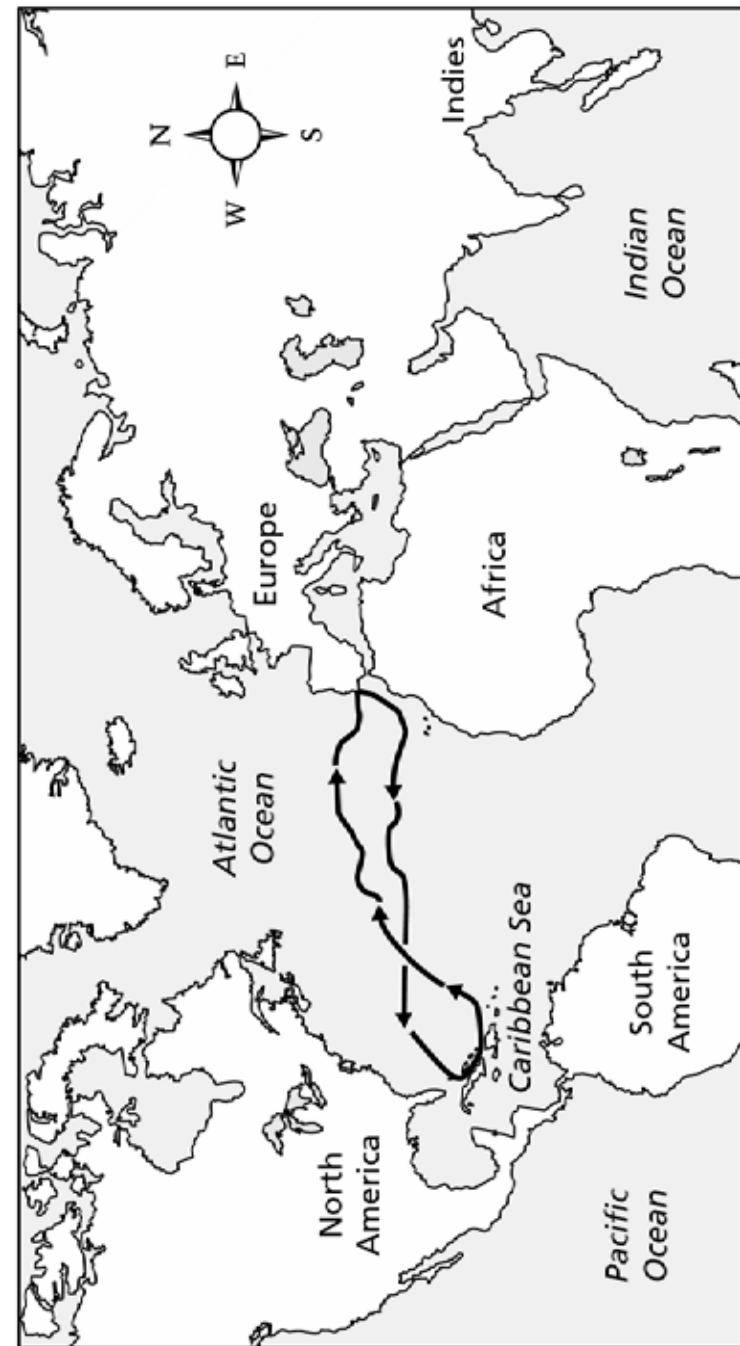
But instead, it was a place that Europeans had never seen before. These continents became known as the Americas.

Every year in October, the United States celebrates the feats of Christopher Columbus. Many people say that Columbus discovered the Americas. But other people disagree. They say that he wasn't the first to discover this land.

So did Columbus really "discover" the Americas? Discovery is when something is found or seen for the first time. But was Columbus really the first person to walk on the American continents? Had anyone come before him?

The Vikings

Some people say that Columbus wasn't even the first European to arrive in America. The Vikings, sailors and warriors from northern Europe, may have explored the northern part of the Americas years before Columbus set sail. The Vikings discovered many northern lands, including Iceland and Greenland. A possible Viking landing site has been discovered in Canada. It is nearly 1,000 years old.



On Columbus's first trip across the Atlantic, he visited the Caribbean Islands.

Early European drawing of Columbus's voyage showing the three ships, the King of Spain, and the Americas



Columbus was not the first person to set foot in the Americas. People had been living there for thousands of years. These people had already made pottery, built pyramids, and studied astronomy. Many different **civilizations** were already there.

In this Leveled Reader, you will learn about three groups of people—the Maya, the Anasazi, and the Inca. The Maya built cities in the rainforest. The Anasazi built houses in the sides of cliffs. And the Inca had cities high up in the mountains. You will read about how and where they lived in the Americas. You will also figure out when they lived. This will help us answer our question: Did Columbus actually discover the Americas?



A Maya pyramid with stairs leading up to the temple at the top

CHAPTER 2: The Maya

Thousands of years ago, the Maya (MAH-yuh) built giant stone pyramids in the Central and South American rainforest. Some pyramids were as tall as ten-story buildings, with steps going all the way up. Priests walked up the steep steps with offerings for the gods. At the top were temples for religious ceremonies.

The Maya knew a lot about **architecture**, astronomy, art, math, and writing. They studied the stars and made calendars. They carved big sculptures and painted bright **murals**. Their math system used dots and bars instead of numerals. Their writing used pictures and symbols instead of words and letters. The Maya wrote on stone surfaces and in books made out of fig tree paper. A few of these books still exist today.

The Maya were farmers who grew crops such as corn, beans, and chili peppers. They liked to eat flat corn cakes, which are now called tortillas (tor-TEE-ahs). The Maya raised turkeys and hunted animals like deer. They traded jaguar skins, jade, and brightly colored bird feathers. At religious festivals, the Maya danced and had feasts.

Most Maya cities had large ball courts. These courts had walls with stone rings high above the ground. They used these courts to play a sacred game in which players hit a rubber ball through the ring. But they weren't allowed to use their hands. They had to hit the ball with their hips, shoulders, and thighs.



The Maya lived in present-day Mexico and Central America. Today, over four million Maya people still live there.

Remaining Ruin: Chichén Itzá

For hundreds of years Chichén Itzá (chee-CHEHN eet-SAH) was the most powerful Maya city. It had a huge open plaza and a giant pyramid. There were also many other buildings, including a steam bath and an observatory for studying the stars. Chichén Itzá was also home to the largest ball court in the area.

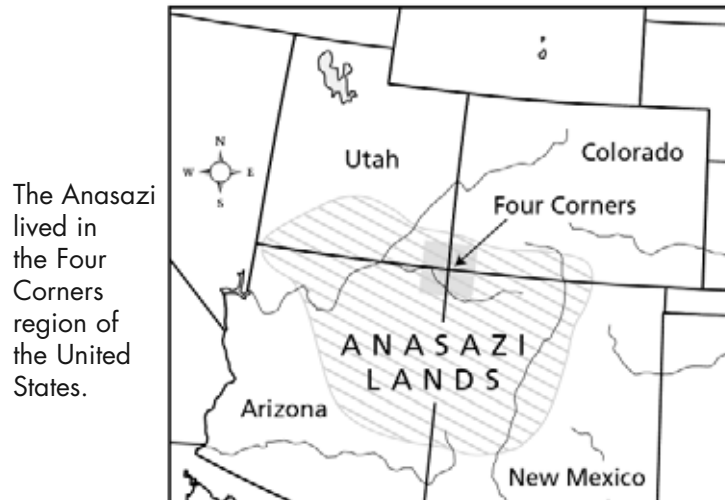
Chichén Itzá is not just a name from the past. You can still find it in southern Mexico. Many of its pyramids still exist. Tourists walk up these old pyramids. They also study the detailed stone carvings. Some sit by the ball court and imagine what the games were like. Nearby, there are even more **ruins**. But these are still buried under soil, plants, and trees.



Chichén Itzá is a popular tourist destination today.

CHAPTER 3: The Anasazi

The story of the Anasazi (ah-nuh-SAH-zee) is amazing and mysterious. The Anasazi were also known as the “cliff dwellers” or the “ancient ones.” They lived in the Southwestern region of today’s United States. These people lived as hunters and then as farmers, growing corn, beans, squash, and cotton. They built sandstone houses in the sides of cliffs. But about 700 years ago, the Anasazi simply vanished from their homes.



The Anasazi lived in the Four Corners region of the United States.

Do You Know?

The Anasazi lived in an area called the Four Corners. It is where the corners of four states meet—Arizona, Colorado, New Mexico, and Utah. If you position your body properly at the Four Corners, you can be in four states at the same time.

Today we know about the Anasazi because they left many clues behind. It seems as if they left one day, meaning to come back. But they never did. Their sandstone houses were still **intact**. Clothes hung from hooks, and pottery lay on the ground. **Archaeologists** later found sandals, baskets, blankets, and garden tools. There were many pieces of beautiful pottery, such as jars and bowls with black and red designs. The Anasazi also left **petroglyphs** of people and animals carved into rock walls.

Why did these people leave their homes so suddenly? To this day, it is still a mystery. Some people believe that a long drought made it too hard to grow food there. Others believe that the Anasazi were suddenly invaded.

We do know that some Anasazi traveled southeast and settled there. Today’s Pueblo people in New Mexico are descendants of the ancient Anasazi.

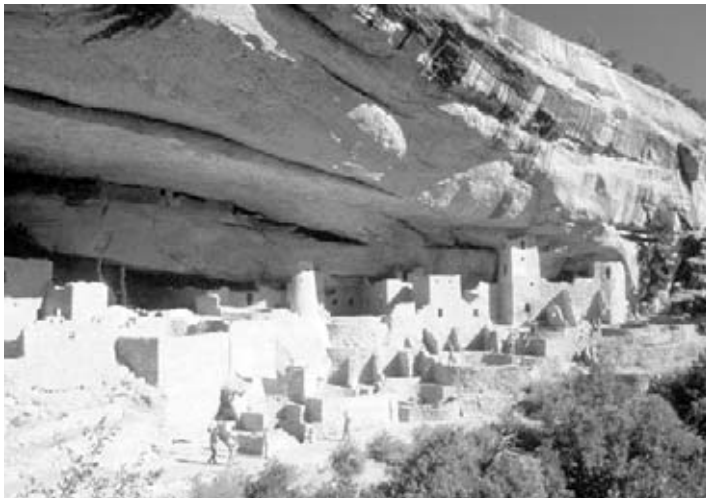


The Anasazi left behind clues about their culture, like this piece of pottery.

Remaining Ruin: Mesa Verde

You can still find signs of the Anasazi today. Perhaps the most amazing Anasazi ruins are at Mesa Verde National Park in Colorado. Many tourists visit this site every year. They walk through ancient houses built into the sides of cliffs.

The most famous ruin is called Cliff Palace. It sits under a big rocky ledge. There are stairs, courtyards, and rooms packed together. Circular rooms called **kivas** remain where the Anasazi held ceremonies. In the museum you can see authentic Anasazi pottery and baskets.



Tourists from all over the world like to explore Cliff Palace.



The Inca empire stretched down the Andean mountains to the coast for more than 4,020 kilometers (2,500 mi.).

CHAPTER 4: The Inca

The Inca lived along the western edge of South America. They built a large and rich empire. The Inca empire covered thousands of miles of jungles, mountains, and beaches.

The Inca were good builders and engineers. They built a network of stone roads that connected towns. They even built long **suspension bridges** over rivers and canyons. Before the age of telephones and cars, they kept in close contact. Messengers ran between towns to relay messages from far away.

The Inca were also master farmers. They cut **terraces** into steep mountainsides. This gave them flat places to grow food. They also dug irrigation canals that brought water to their crops. They grew corn, cotton, potatoes, and **quinoa** (KEY-no-ah). Llamas helped the Inca carry things up the mountains.

Today relatives of the Inca still live high in the green Andes. On steep, sloping lands they grow foods like quinoa. Some still speak the ancient language, Quechua, and live like their Inca ancestors. Music groups play drums and make beautiful, haunting sounds with traditional flutes. Today musicians from Ecuador and Peru play popular Andean music all around the world.



The Inca used llama wool to make warm clothing.

Remaining Ruin: Machu Picchu

Machu Picchu (MA-choo PEE-choo) is one of the most impressive ruins in the Americas. It is an ancient Inca city built out of stone. It is perched high on a green mountaintop in Peru. Machu Picchu is so isolated that the outside world didn't know about it until 1911. Machu Picchu may have been a home for a royal family.

The "Inca Trail" is a famous stone path that still leads to Machu Picchu. Today tourists from all over the world travel to Peru to hike the Inca Trail. They follow a four-day route over high mountain passes. They also walk by other Inca ruins. At the end, hikers arrive at a stunning view of Machu Picchu.

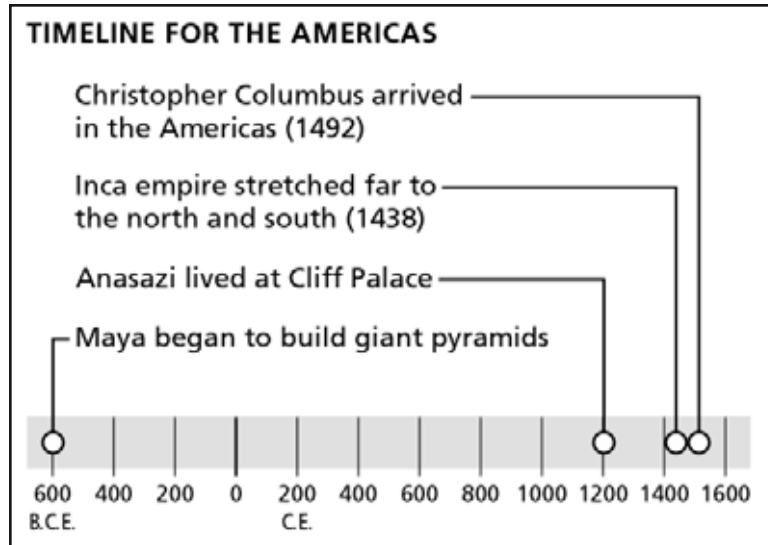


Machu Picchu is famous for its beauty and location.

CHAPTER 5: Point of View

Now you have learned about different people from the Americas. You know about the Maya, the Anasazi, and the Inca. So let's go back to our original question. Did Columbus really discover the Americas?

Let's look at the timeline below. On the right, you can see that Columbus arrived in 1492. More than fifty years before that, the Inca empire was already **flourishing**. In 1200, the Anasazi lived at Cliff Palace. And long before all of that, the Maya were building giant pyramids.



This timeline shows that people lived in the Americas long before Columbus arrived.



These ancient petroglyphs are from Anasazi land in Utah.

It is clear that many people lived in the Americas before 1492. Columbus himself even wrote about the local people he met. When Columbus first arrived, he thought he had landed in the Indies. That's why he mistakenly called the local people "Indians." For many years, the people from the Americas have been called Indians. But now more people call them **Native Americans**. This is because they are **native** to the Americas. Their families have lived here for many years.

If you want to learn more about Native Americans, you can study their ruins. You already know that Chichén Itzá is in Mexico, Cliff Palace is in Colorado, and Machu Picchu is in Peru. These ruins are proof of the people who lived in the Americas before Columbus. If you are lucky enough to visit the ruins, you may meet Native American people in those areas. It was their ancestors who built these cities long ago.

So why do people still say that Columbus discovered the Americas?

Well, the answer to this question probably depends on **perspective**. Perspective is the point of view from which you see something. From the perspective of the Europeans, Columbus had found new land. So for them, it was a discovery.

But from the perspective of the Native Americans, Columbus hadn't discovered their land. These people had already been eating, sleeping, and farming there for many years. So depending on the perspective, both sides could be right. Maybe we could better say that Columbus explored the Americas. That's probably more accurate than saying he discovered them.



Quecha porters serve as guides on the Inca Trail to Machu Picchu.

Explore More

There's a lot more to learn about Native Americans. You can read about the Maya, Anasazi, and Inca.

❶ At the Library

Tell your librarian you're interested in learning more about these Native Americans. Ask where you can find books about them.

❷ On the Web

- A. In the address window, type: *www.google.com*.
- B. Then type: *Native Americans* or the name of a particular group, such as *Maya*. Click on "Google Search."
- C. Read the colored links. Click on one that looks interesting.
- D. When you want to explore other links, click the back arrow on the top left.
- E. Or try some different searches: *Anasazi*, *Inca*, or *Christopher Columbus*.

③ Try To Decipher Maya Math!

The Maya people used a different counting system than we do. Instead of numerals like “1, 2, 3,” they used dots and bars. One dot equaled “1” and one bar equaled “5.” See if you can guess what these numbers are:

A) • •

B) ••••

C) —

D) ••
—

E) ==

F) ••••
==

Key:

• = 1

— = 5

A) 2 B) 4 C) 5 D) 7 E) 10 F) 14

Answer Key

Glossary

archaeologist	a person who studies things from long ago by looking at the items left behind (p. 12)
architecture	the design and construction of buildings (p. 8)
civilization	the culture and way of life of a particular place (p. 7)
flourishing	doing very well; at its peak (p. 17)
intact	still put together; not broken or changed (p. 12)
kiva	an underground room used by the Anasazi for ceremonies (p. 13)
murals	large paintings painted on walls (p. 8)
native	a person who was born in that place (p. 18)
Native Americans	people who were living in the Americas before Christopher Columbus arrived (p. 18)
perspective	a point of view or way of looking at something (p. 19)
petroglyph	an old rock carving (p. 12)
quinoa	a starchy, nutritious plant found in the Andean mountains (p. 15)
ruin	the remains of an old building (p. 10)
suspension bridge	a bridge held up by cables or ropes, such as the Golden Gate Bridge (p. 14)
terrace	a hillside that is carved into large staircase shapes to make flat ground for farming (p. 15)

Name _____

INSTRUCTIONS: Fill out the Point of View chart below.

Author's Purpose	
Author's Opinion	Reasons for Author's Opinion
My Opinion	Reasons for My Opinion

Name _____

INSTRUCTIONS: Add the suffix *-ion* to make a new word. (You may need to drop a letter.) Use the new word in a sentence.

Root Word	New Word	Sentence
champ		
attract		
express		
complete		
operate		
distract		
create		
direct		
exhibit		

Robin Hood and the King

A Reading A-Z Level W Leveled Reader

Word Count: 1,633



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Robin Hood and the King



An English Folktale Adapted by Katherine Follett
Illustrated by David Cockcroft

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Robin Hood and the King

This story is an English folktale adapted for Reading A-Z by Katherine Follett from an original retelling by Bertha E. Bush published in 1912.



An English Folktale
Adapted by Katherine Follett
Illustrated by David Cockcroft

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Introduction

Robin Hood and his Merry Men lived in hiding in Sherwood Forest, because every French lord in the land wanted to hang Robin for highway robbery. Even though Robin and his band were outlaws, they only stole from the rich, so they could give money to the poor. Robin thought the greedy French lords were the real thieves and outlaws. They were the ones who seized the money and land from the poor in the first place. They had conquered England, and they ruled the land while kind King Richard was off at war. But the French soon found that the English people hated the cruel lords, while they loved and admired Robin Hood. Even the king himself, when he returned from war, could not help respecting this outlaw who tricked the corrupt rulers.



King Richard

"I wish I could see Robin Hood," said King Richard. "I wish I could see him and his men shoot and wrestle and do all the things that show off their amazing skills. But if they heard that the king was coming, they would think that I only wanted to arrest them. They would flee deep into the forest and I would never get a glimpse of them."

King Richard spoke kindly, for he loved all sports and those who excelled in them. Robin Hood and his band were well known to be the best archers, wrestlers, and sword fighters in all the land. They spent all their days in the forest practicing these arts.

"I would give a hundred **pounds** to see Robin Hood and his Merry Men of Greenwood," he said.

"I'll tell you how you can see him," laughed one of the king's trusty companions. "Put on the robes of a fat **abbot** and ride through Sherwood Forest with a hundred pounds in your pouch. You will be sure he will offer you a feast, to try and steal your money." For this was how Robin Hood **lured** the wealthy lords into the forest. No greedy nobleman could refuse a feast, even if they suspected it was offered by an outlaw.

"I'll do it!" cried King Richard, slapping his knee. "It will be a huge joke."





The Feast

So the king and seven of his followers dressed themselves as an abbot and seven **friars**. They rode out along the highway toward Sherwood Forest. Sure enough, Robin Hood and his men took them and brought them to the meeting tree, and there they searched them and took the pouch of gold. But they returned one third of the gold to the king, because it was not their custom to leave any man in need. Robin Hood was pleased with these churchmen because they did not resist or scold him. In fact, they seemed happy to be in his company.

"Now we shall give you a feast that will be worth all your money," said Robin Hood.

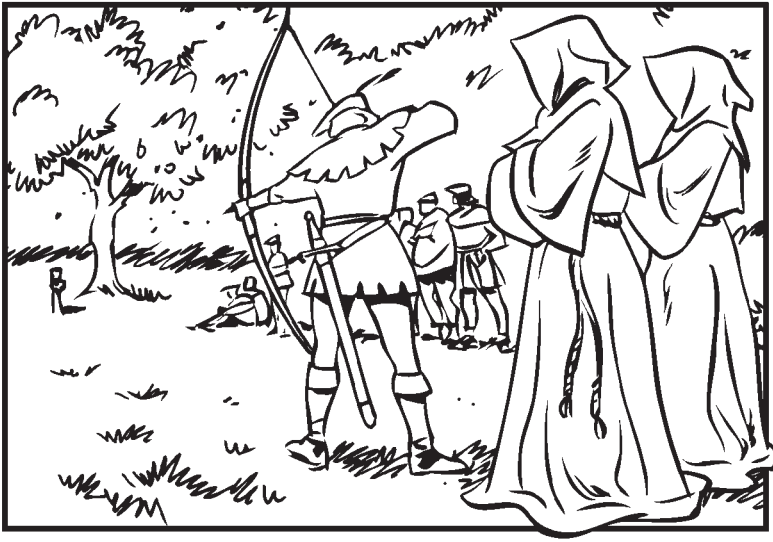
"I have a good appetite for a feast," said the pretend abbot. "But even more, I would like to see the archery and wrestling and all those other things in which I have heard you are so good at."

"You will see the very best we can do," answered Robin, "but, Holy Father, why don't you take off your hood so you can enjoy this sweet evening air?"

"No, I cannot," answered the pretend abbot, "because I and my brothers have vowed not to let our faces be seen during this journey."

"Very well, then," said Robin Hood. "I interfere with no man's vows." And he never once thought that he was entertaining the king.

Robin and his men gave a splendid feast of roasted **venison** and pheasants and fish and wild **fowl**, all cooked perfectly over the roaring fire. The King was very impressed with the delicious food the Merry Men seemed to produce out of nothing but the forest. He had no idea that outlaws could be so well fed and happy. After they cleared the dishes, they arranged the sports.



The Archery Match

The archery target was a mark that only the best archers could hit, made of a tiny **garland** of leaves and flowers hanging from a stake a great distance away.

"Now shoot!" said Robin Hood. "Each of you will have three shots, and anyone who fails to place his arrows within the garland will receive a punch to the side of the head as hard as I can give."

"Can anyone hit inside that little garland at such a distance?" asked the king in amazement.

"Look and see, friend abbot," answered Robin Hood proudly.

First, David of Doncaster shot and **lodged** all three arrows within the garland while the king looked on, astonished. Then Midge, the miller's son, also placed all his arrows inside the garland. These truly were the best archers in all of England, and the King had not yet seen Robin Hood, who was the best of all. Then Wat the Tinker drew his bow, but he was unlucky—one of his arrows barely missed the mark.

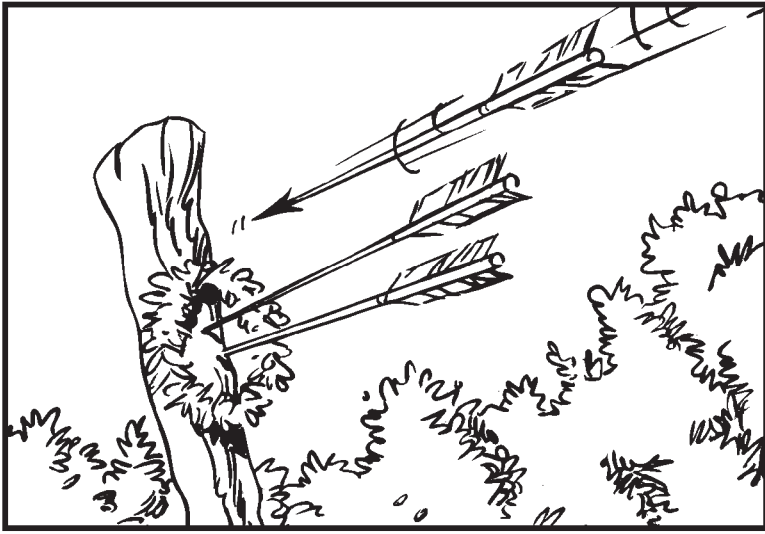
"Come here and take your punishment," called Robin Hood. The king supposed that, since Wat had missed by so little, he would receive only a tap. Instead, he got a blow that knocked him head over heels.

"Ha, ha, ha!" laughed his companions.

"Oh ho!" thought King Richard, "I am glad I am not in this." But he was impressed with the way Robin Hood's men obeyed him. "They are better at following his commands than my servants are at following mine," he thought.

The shooting went on, and most of the men shot their arrows within the garland, but a few missed and received tremendous punches.

The last to shoot was Robin Hood. His first shaft struck so hard, it split off a piece of the



stake on which the garland was hung. His second lodged a **scant** inch from the first. But the last arrow he shot was not feathered right, and it swerved to one side and struck an inch outside the garland.

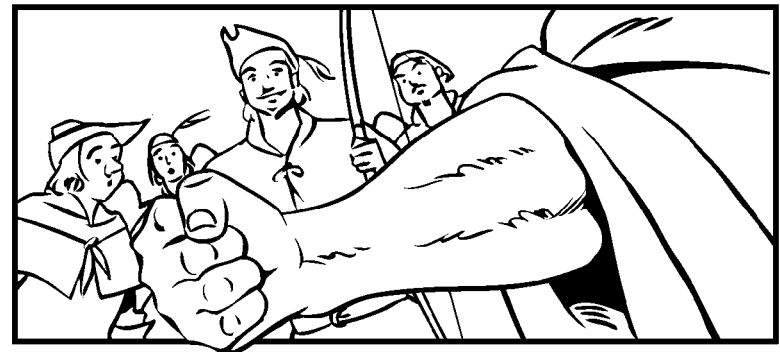
Then all the company roared with good-natured laughter, for they seldom saw their master miss.

"Go and take your punishment, master," said Midge, the miller's son, "and I hope it will be as rough as Wat's was."

"Well," said Robin Hood, "I will surrender my arrow to our guest and take my punishment from him."

Robin was being somewhat crafty in this. Although he did not mind hard knocks at all, he did not like the thought of being sent **sprawling** in front of his band. He figured that the arms of a churchman would be soft, for they never worked or used their muscles much. But the pretend abbot bared an arm so thick and muscular that it made the men stare. King Richard was an active king, and years at war had made him incredibly strong. Robin Hood placed himself squarely in front of him, and the king struck a blow that would have knocked out an ox. Down went Robin Hood, rolling over and over on the ground while his men shouted with laughter.

"Well," said Robin Hood, sitting up, half dazed, "I did not think that there was an arm in England that could strike such a blow. Who are you, man? I'll bet you are not the churchman you appear to be."





King Richard Reveals Himself

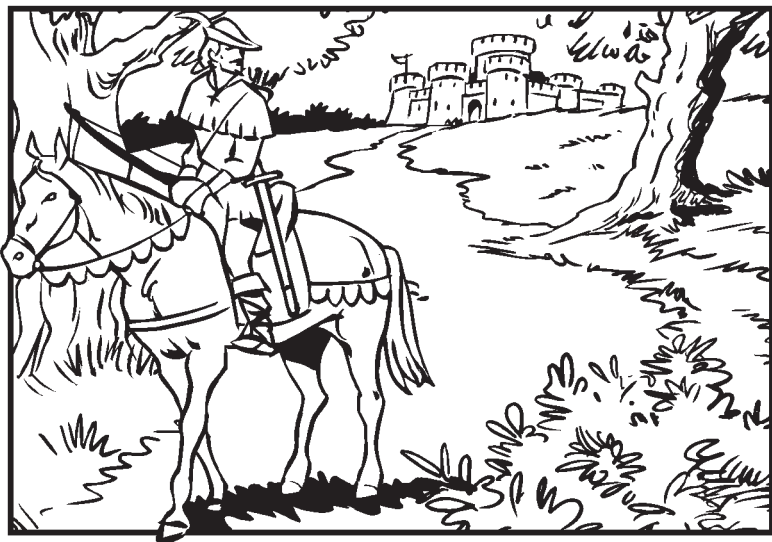
King Richard threw back his hood, and Robin knew it was his king. If he had been a disloyal man as well as an outlaw, he would have trembled. But Robin had always remained loyal to his King. Indeed, he believed that stealing from the French and giving to the English poor was the greatest service he could perform for King Richard. Robin Hood had never knelt for any lord, but there was no shame in his voice when he knelt before the king.

"Your majesty," he said, "you have no subjects in all England who are more loyal than I and my Merry Men. We have done no evil except to the greedy and rich who have abused your subjects. We beg your pardon if we have done wrong, and we beg for your protection, as we always serve you faithfully."

Then the king looked down in amazement that an outlaw should speak so well. He was also amazed that Robin Hood hadn't run away in fear of being arrested. He saw that Robin Hood truly was one of his best subjects. King Richard also knew that Robin was the best archer in all England, and he wanted him by his side.

"I will forgive all your law-breaking and order the nobles to leave you alone," he said, "if you will come with me to my court and serve me there. You shall bring Little John and Wat and Will Scarlet to become knights in my court. As for the rest of your men, I will make them royal **rangers**, since I am sure they can protect Sherwood Forest better than anyone. They have done good deeds in providing for the English poor."

"With all my heart," replied Robin Hood, and a great roar went up from the Merry Men. They



adored their king, and though they loved the outlaw life, they had always wanted their good deeds to be recognized by the throne.

So Robin Hood left the greenwood and went to the king's court where he served King Richard well. His men became rangers of the forest, and never again feared punishment from wicked sheriffs. Robin Hood was never far from the forest, though. He often disguised himself as a greedy noble, **laden** with the king's gold, and rode through Sherwood Forest. Only after his men had stolen from him did he reveal himself, congratulating them on their work. The common folk of England never had to suffer the injustice of the French again.

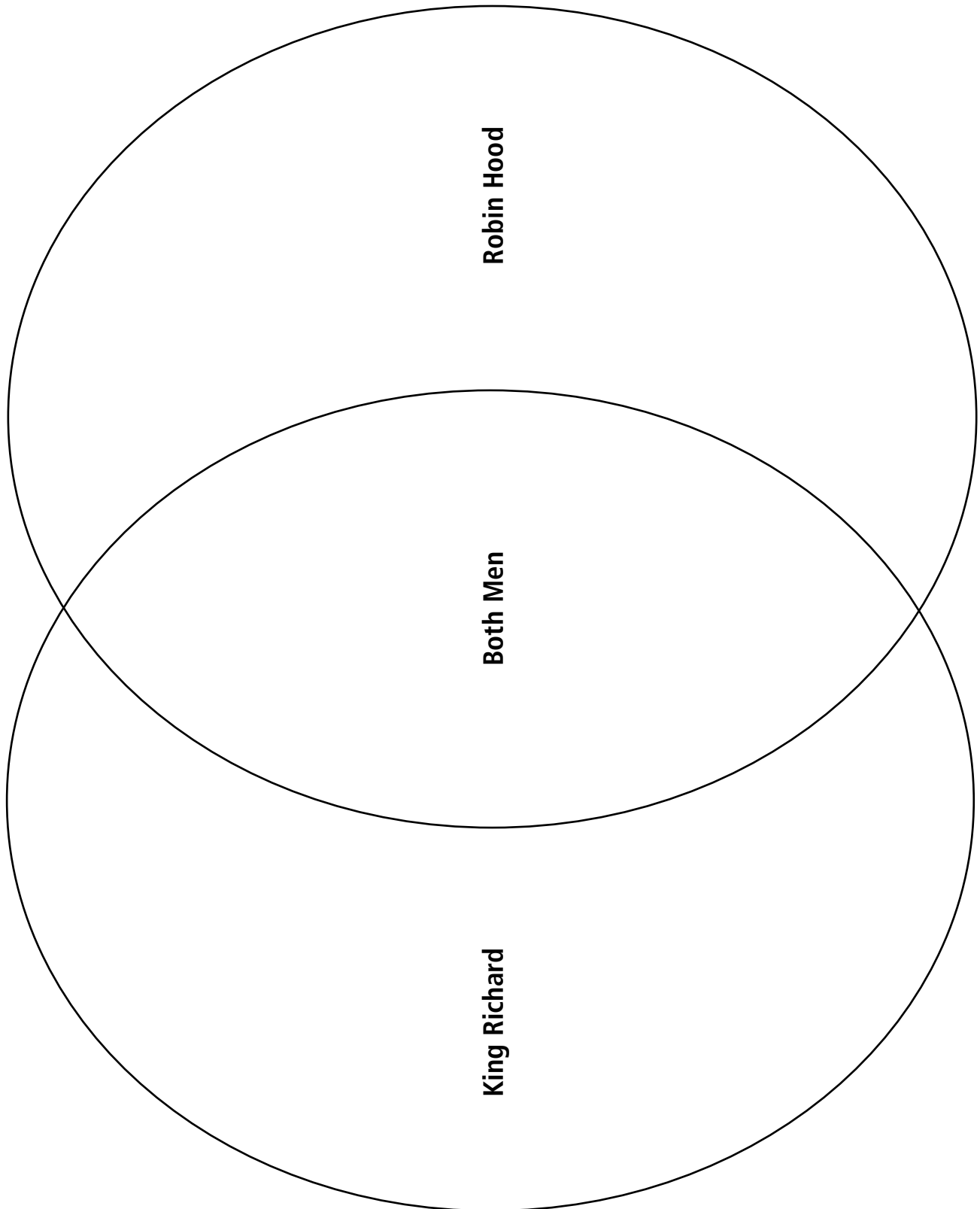
Glossary

abbot	the leader of a group of religious monks (p. 6)
friar	a certain kind of Christian monk (p. 7)
fowl	birds (p. 8)
garland	a small group of branches arranged in a circle or semicircle (p. 9)
laden	covered with; heavy with (p. 15)
lodged	stuck in deeply and securely (p. 10)
lured	led by the promise of something good; tempted (p. 6)
pounds	British unit of money, worth about \$1.50 in U.S. dollars and \$2.50 in Canadian dollars (p. 6)
rangers	people who watch over and protect a forest or wooded area (p. 14)
scant	very little; tiny; barely (p. 11)
sprawling	laid out flat with arms and legs spread out (p. 12)
venison	deer meat (p. 8)

Name _____

INSTRUCTIONS: Fill out the Venn diagram below. In the circle marked "King Richard," list all of King Richard's qualities. Do the same for Robin Hood in the circle marked "Robin Hood." If both men share the same quality, list that quality in the center, where the circles overlap.

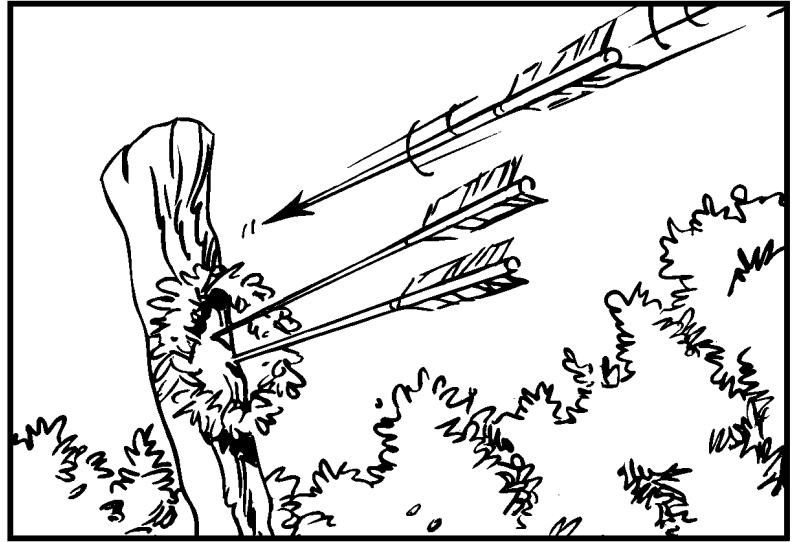
Venn Diagram



Name _____

INSTRUCTIONS: Fill in the blanks with words that make sense.

First, David of Doncaster shot
and _____ all three
arrows within the garland while
the king _____,
astonished. Then Midge, the
miller's son, also _____
all his arrows inside the garland.



Then Wat the Tinker _____ his bow, but he was unlucky—one of his arrows
barely _____ the mark.

"Come here and take your punishment," _____ Robin Hood. The king
_____ that, since Wat had _____ by so little, he would
_____ only a tap. Instead he got a blow that _____ him head over
heels.

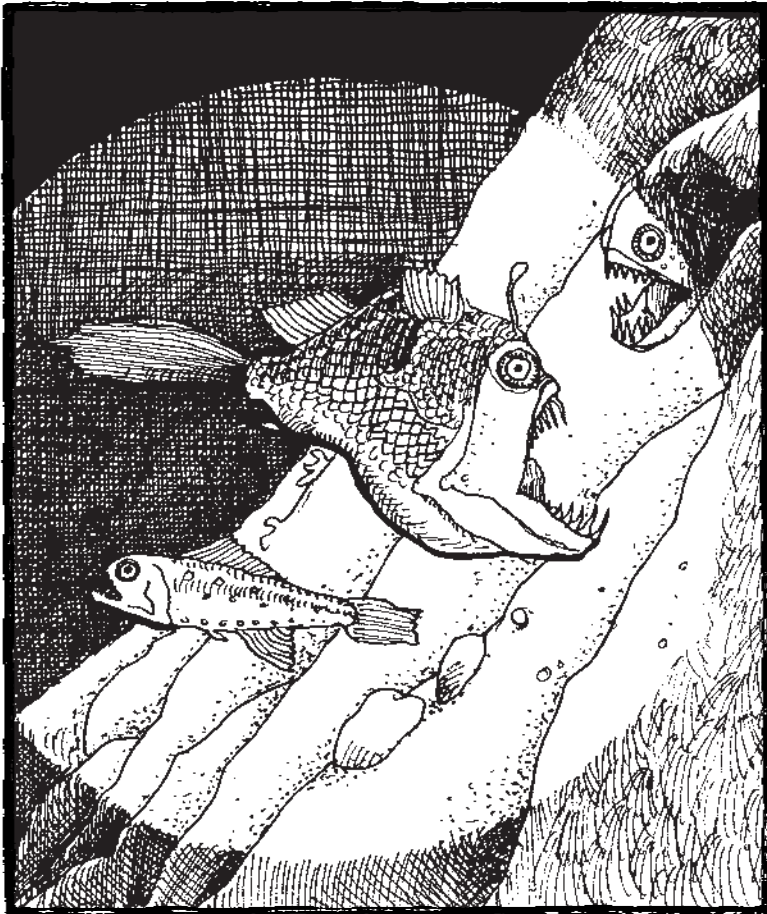
"Oh ho!" thought King Richard. "I am _____ I am not in this." But he was
_____ with the way Robin Hood's men obeyed him. "They _____
better at following his commands than my servants are at following mine."

The shooting _____ on, and most of the men _____ their arrows
within the garland, but a few missed and _____ tremendous punches.

Ocean Quiz

A Reading A-Z Level W Leveled Reader

Word Count: 2,989



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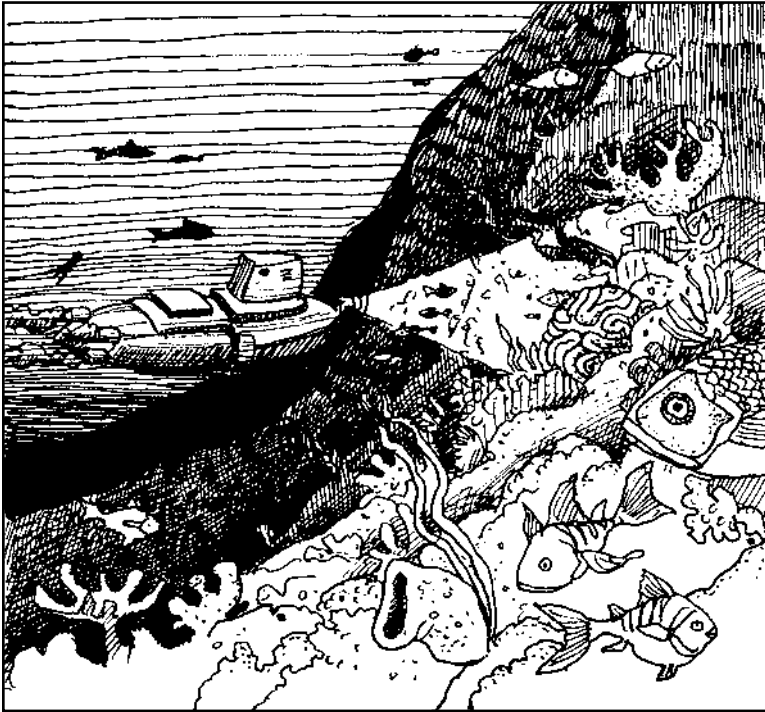
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Chapter 1

Just as Maggie and her parents sat down for dinner, the telephone rang. Maggie sprang up to answer it, dashing into the other room and leaving a clattering fork on the floor behind her. She shouted so loudly that her parents heard every word.

“Did we make it?” she gasped, without even saying hello. “You’re kidding; who else? Oh no, not that know-it-all. Well whatever, as long as you and I are on the team. I’ll see you tomorrow.”

Maggie hopped back into the kitchen, where her parents were smiling.

“Mom, Dad, we made it! Caroline and I are going to represent the school at the Kid Quiz Bowl, and we might even win a school field day at Shamu Ocean World! Even if we don’t win,

the team members get out of class for an hour a day to get ready. I'm so excited—this is going to be great!"

"Slow down, Maggie, you haven't won yet," Maggie's mother laughed. "I'll bet it's going to be a lot of responsibility representing the entire school."

"And you shouldn't get so wrapped up in the contest that you neglect your other subjects," said her father.

Maggie giggled, "I'll be fine, and besides, we'll be learning as we practice for the Quiz Bowl. The topic this year is oceans, which is pretty much the whole planet, since two-thirds of the earth is covered with water. Hey, Dad, that snorkeling trip last summer will pay off—I'll be the only one on the team who's been in the ocean! May I be excused? I think I'm too excited to eat, and do you think you could drive me to the library tonight?"

Before her parents could open their mouths, Maggie bounded up the stairs, still hollering about winning the Bowl, going to Shamu Ocean World, swimming with dolphins, and kissing whales. Then her door happily slammed, and her parents shook their heads.



Chapter 2

The next day, Maggie and her team got out of math and met in the school library. Maggie and Caroline were the second ones there, and sitting at a table was Tad, leaning over a book. Caroline rolled her eyes a little.

Tad looked up. "The first order of business, I think, is for us to decide on a name. A team name is critical for defining who we are and **intimidating** our competitors," he said. Then he looked around. "Aren't we supposed to have a fourth team member?"

Just then, Bert rushed in, a little out of breath. "Sorry I'm late," he said, blushing.

"Well, on to business again," Tad said. "I nominate *Panthalassa*, which was the first giant ocean that existed before the continental plates moved and divided. In fact, Panthalassa still exists, when you realize that all the oceans are connected."

"Oh, please, Tad, everyone knows that there's the Atlantic Ocean, the Pacific, the Indian . . ." Caroline said.

"Actually, if you look at a globe, you can see how the Pacific and the Atlantic meet below South America, and the Indian joins the Atlantic south of Africa." Tad slid the globe across the table and spun it under his thin fingers.

"**Theoretically**, you could sail from one ocean to all the others without ever touching land. We simply divide the oceans for our convenience, but all the continents are just massive islands in an even larger ocean."

"Okay, okay," Maggie interrupted, "there's too much information to cover for us to waste time worrying about our name. I think things will go faster if we divide up the research, so I've put the names of the different zones of the ocean floor in my bag. We'll each choose one, research it, and then share what we've found. I'll pick first. Continental shelf," Maggie read.

"Ah, yes," Tad sniffed, pushing up his glasses, "you'll be looking into the shallowest part of the ocean where the land first **submerges**. You may as well be researching a wading pool."

"Teamwork, Tad, we don't have time for insults. You draw next, Caroline," Maggie said.

"Continental slope," Caroline read.

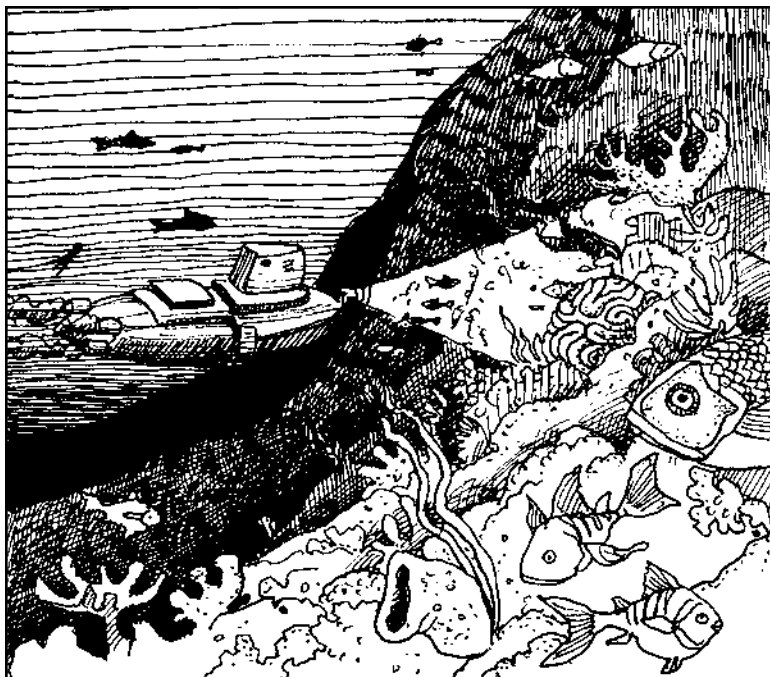
"Another easy one," Tad said. "The slope is the cliff-like boundary between the continental shelf and the deep ocean floor. And now for my topic . . . the **abyssal** plain. I'll be covering the entire ocean floor, including mountain ranges, valleys, hills, faults, and even **seamounts**, which are undersea volcanic mountains higher than the Himalayas."

"Save it for the Quiz Bowl," Caroline grumbled. Bert reached in and drew the last piece of paper.

"Ocean **trenches**," he said.

"Bert, I envy you; you'll be studying the most recent discoveries about the deepest and darkest places in the ocean. Trade with me," said Tad.

"No trades," Maggie insisted. "We don't have time. There's only three weeks until the Kid Quiz Bowl, so we all need to get to work."



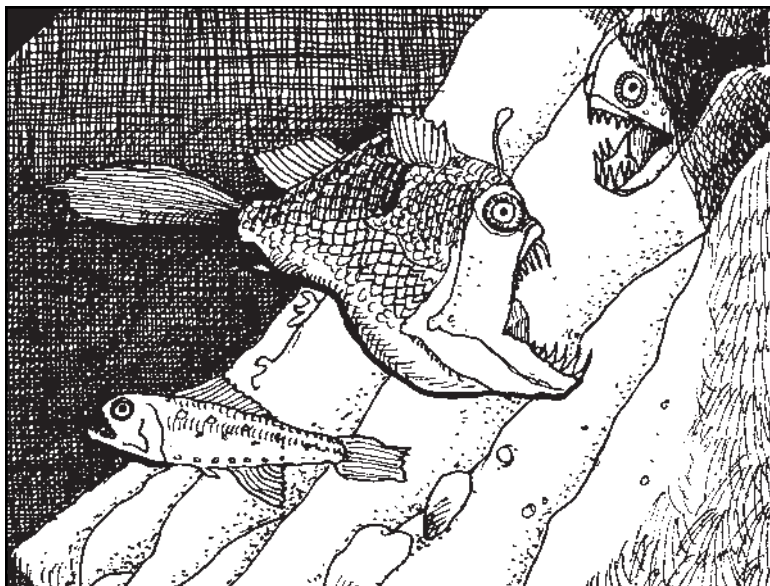
Chapter 3

Caroline flopped down in a chair in front of a library computer. She logged on to the Internet and typed “continental slope” into a search engine. The search brought back hundreds of hits, and Caroline sighed. She started searching for Web sites about movie stars, but then she saw Tad browsing the shelves behind her, and she quickly went back to oceans. *Research is annoying*, she thought, taking a look around the library. She spied a sign on the ceiling that pointed to another room. “Videos,” it read.

The librarian helped Caroline find a stack of tapes about the oceans, even stuff on animals and fishing and things that she didn’t think she’d need. She chose one about deep ocean submarines that explore the continental slope, popped it in the VCR, and began to take notes.

The continental slope *was* like an underwater cliff, sometimes dropping from 200 meters (660 ft.) down to 5,000 meters (3 mi.). At the top of the slope was Maggie’s area, the continental shelf. Rivers deposited **sediment** onto the shelf until the sediment pushed to the edge of the slope and rained down the cliff wall. The sediment landed at the bottom, forming a soft, sloping pile called the continental rise. The rise could stretch across the ocean floor for 1,000 kilometers (600 mi.).

In the video, scientists launched the submarine in the water above the continental slope. Once it got to the edge of the slope, it began to descend, shining a floodlight on the cliff wall. All along the slope grew the sun-loving ocean plants and animals Caroline was familiar with. She spotted brain coral and sea pens, sea urchins, anemone, shrimp and lobster, even an octopus. Sharks and other fish swam by.



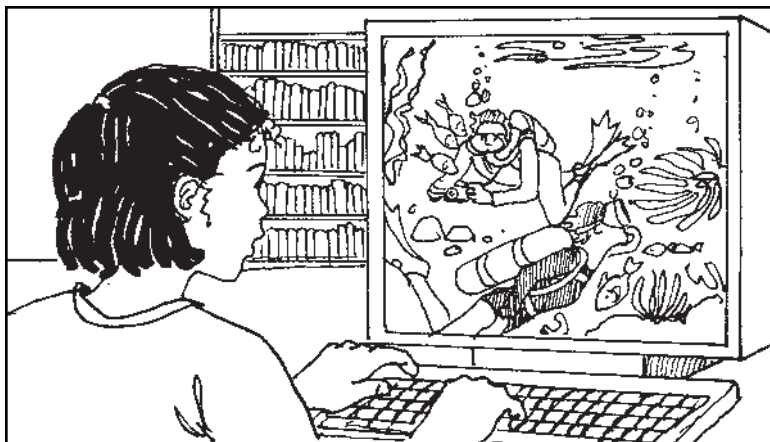
Then the water began to get darker, and the plants began to disappear, leaving just squid and some dark-colored fish. The fish began to get strange looking, with large mouths, huge eyes, and even little glowing spots. Then everything outside the submarine's floodlight was black. Occasionally a tiny light swam by, but when it swam into the light, the little glowing animal turned out to be totally **transparent**.

Then, with a whoosh, the submarine brushed the bottom, churning up clouds of dust. This was the muddy sediment that **sloughed** off from the river deposits on the continental shelf. The submarine had reached the continental rise.

Bert couldn't seem to find any information on ocean trenches, and he couldn't understand why Tad was so excited about them. The librarian told him that most of the research was pretty new, so it wasn't widely available. There weren't any books in the school library, and the one he found in the public library was full of super-long science words. Plus, he was way behind in his other homework. He told himself he would only work on his history report for ten minutes, but when he looked up, it was an hour later.

But then he skimmed through the *Guinness Book of World Records* and finally found something about trenches. The Mariana Trench in the Pacific Ocean was the deepest point on Earth, at 9.6 kilometers (6 mi.) deep. In 1960, it took the Swiss scientist Jacques Piccard four hours and forty-eight minutes to dive down into the trench in his **bathyscaphe**.

Bert looked up *bathyscaphe* in the dictionary and wrote down that it meant a small submarine. Then he looked up *trench* and learned that ocean trenches form when one tectonic plate slides under another, but before he had time to finish writing his sentence, the bell rang.

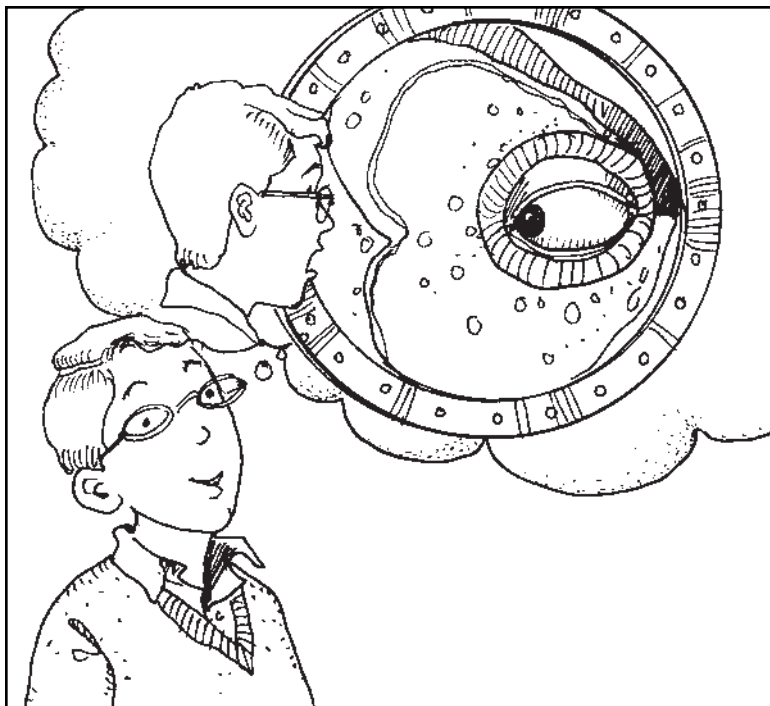


Maggie tried the same approach as Caroline, sitting down at one of the library computers and typing “continental shelf” into a search engine. But instead of giving up when she got hundreds of hits, she began to poke around. It wasn’t hard to find information, and Maggie nearly got lost chasing links about coral reefs, fishing practices, and tide pools. In fact, most of the things she could think of about the ocean fell under the category of the continental shelf.

This was because the continental shelf received the most sunlight, which allowed more sea life to function there than anywhere else. It was also the shallowest part of the sea, so more research was done there. The shelf was only about 200 meters (660 ft.) deep on average, so it was very shallow compared to the rest of the sea floor.

She found out that the land forming the continental shelf was the same land that formed the continents, only the shelf land was underwater. All of the continents, including Eurasia, North and South America, and Africa, had continental shelves. The width of the continental shelf varied from continent to continent. The South American shelf only went out about 200 kilometers (125 mi.), while the shelf off the coast of northern Asia stretched into the sea for 1,600 kilometers (1,000 mi.).

Tad walked up one library aisle and down the other, up one aisle and down the other. His books at home had plenty of information about the abyssal plain. In fact, he probably knew as much about the abyssal plain by heart as any of the rest of them would find out about their topics from research. He knew that the plain was the deepest part of the ocean, below 2,000 meters (6,500 ft.), and that it covered almost 75 percent of the ocean floor. The total area covered 20, no, 200 million square kilometers (77 million sq. mi.). By contrast, all the land on the planet only covered 150 million square kilometers (58 million sq. mi.). But there was hardly any life down there because of the intense water pressure and darkness.



He knew that the volcano Mauna Kea in Hawaii actually rose into the sky all the way from the abyssal plain. If you measured it to the bottom, it was a full 10,203 meters (33,346 ft.) high. That was nearly 1,500 meters (4,921 ft.) taller than Mt. Everest. He also knew that the creatures in the abyssal plain were completely freaky, like the mythical giant squid, which no human had ever seen alive. Tad privately thought he'd be just the right biologist to find the first living giant squid. *This research is a snap*, he thought, without ever opening a book.

A few days before the Quiz Bowl, the kids came together and shared their information.

"This is awesome, guys. You brought back tons of facts," Maggie said.

"Well, except you, Bert," Tad said. "Couldn't you find anything else to report on besides the deepest trench?"

"Well," Bert stammered, "I sort of ran out of time. It's tough with all my other classes, and you wouldn't believe how little information there was."

"But what about the undersea geysers? The mineral-spewing chimneys that send boiling toxic **plumes** into the ocean depths, feeding bacteria? The fantastic tube worms and giant clams that scientists had assumed could not live without light?" Tad demanded.

"Okay, it's all right," Maggie said. "We have plenty to work with, and Bert's right, it's tough with our other classes. We all just have to work as a team, because the Quiz Bowl is this weekend."

And it was.



Chapter 4

"I'm so nervous I can't see," Caroline whispered to Maggie, peeking out from behind the black curtain onto the stage of the auditorium.

"No kidding," Maggie whispered back. The bright stage lights shone right in their eyes. Bert nervously chewed a pencil, Caroline hopped from foot to foot, and Maggie could feel her palms sweating. The bright lights, the audience, and the pressure to win were more than the team had counted on. This was the final round, and they were battling Shelbyville for the field day at Shamu Ocean World. The only one who looked calm was Tad, who stood perfectly still.

"Okay, Deerfield, you're on," the stage manager said. The team walked nervously to their platform and stood in a row behind their four red buttons, waiting for the questions to begin. The host stood at a **podium** with a booming microphone.

"Welcome, everyone, to the final round of the seventh annual Kid Quiz Bowl competition. We're down to our last two teams, and the one that wins this round will receive the free trip to Shamu Ocean World for their whole school! If you think you know the answer to the question, quickly hit the buzzer and you will get a chance to respond. If you miss a question, the other team automatically gets a chance to respond. Are we ready? Question one: What is the largest ocean on Earth?"

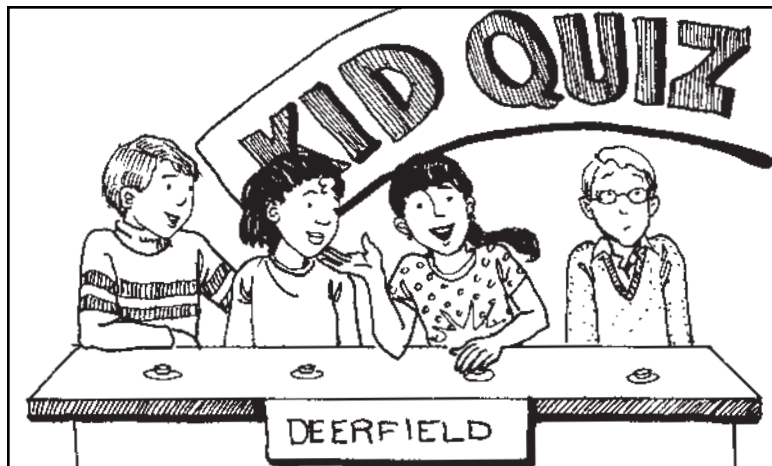
Buzz! Caroline smacked her red button.

"Deerfield, your answer is?"

"The Pacific," screamed Caroline.

"You're right, for one point." The team hopped up and down before the host moved on. "Question two: What is the world's largest fish?"

Buzz! The question went to Shelbyville. "The whale shark," came an answer from the opposing side.



"One point for Shelbyville. Question three: What does *salinity* mean?"

Buzz! "Shelbyville, your answer?"

"Saltiness," replied the same student from the other side.

"Question four: What material makes up most of the Great Barrier Reef?"

Buzz! It seemed like Deerfield just wasn't fast enough. "Limestone!" called out one member of the Shelbyville team.

"I'm sorry, Shelbyville, that is incorrect. Deerfield, you get a chance to give the correct answer."

"Coral!" Maggie shouted.

The teams went back and forth, one breaking into the lead, the other catching up, until all thirty questions had been asked. It was fifteen and fifteen—a tie, so there had to be a tiebreaker. The host got a serious look on his face.

"Since this question will break the tie and determine the overall winner of this competition, it will be a little different from the previous ones. Each team may nominate one member to represent it. That member alone will answer the question. We'll take a little break to give each team time to choose its representative."

The team huddled. "Why haven't you been answering any questions, Tad?" asked Maggie.

"Oh, these questions have all been pretty simple, so I thought I'd give the rest of you guys a chance," Tad said, shrugging.

"Well, you should be the perfect candidate to represent our team for the tiebreaker," Maggie said. The team agreed to send Tad out, but Tad only responded by shrugging again.

"He'd better be as smart as he acts," Caroline muttered.

"Okay," said the host, returning to the podium. "Here is the tie-breaking question, and

it has two parts, so take your time. What is the name of the deepest trench in the ocean, and in which ocean is it located?"

Maggie started laughing, Caroline jumped up and down, and Bert did a victory dance. There was no way Tad could miss this one—after all, he'd made fun of Bert for writing it down, as if everyone already knew it.

Buzz! "Deerfield?"

"All right!" Bert burst out before the team could shush him. Then, everything seemed quiet for an awfully long time.

"Deerfield, I need your answer," the host said.

"What's he doing?" Caroline hissed. Tad stared blankly ahead.

"Fifteen seconds, Deerfield." Another long silence. "I'm sorry, Deerfield, but your time is up. Shelbyville, your question."

"The Mariana Trench in the Pacific Ocean," the Shelbyville student answered confidently.

"You are correct! Shelbyville School is going to spend a field day at Shamu Ocean World!" The other team leapt up and down while Maggie, Caroline, and Bert stood **sullenly** in the wings. Tad didn't move.



Chapter 5

Back at school, Maggie, Caroline, Tad, and Bert met at their table in the library.

"What happened to you out there, Tad?" scolded Caroline. "You didn't even blink, and we depended on your brains to win. Plus, that question was so obvious."

"Yeah, even I knew the answer to the trench question," Bert said.

Tad stared down at his hands and muttered something the rest of the team couldn't hear.

"What's that?" Maggie asked.

"I just said I'm sorry I let you guys down. I froze, I choked, I blew it. I just couldn't think. I knew the answer, but I kept remembering how I treated Bert, and how **ironic** it was that his information ended up being what we really needed. I'm sorry, but I felt so isolated out there."

Maggie, Caroline, and Bert exchanged looks. "I guess it could have happened to any of us," Maggie said. "Oh well, we made a good show, and after all, we were tied until the very end. And they gave us those neat pens with the little clown fish that swim up and down."

"Hey," Caroline said, "I hear that next year's topic might be the solar system, and the prize will be a trip to the planetarium."

"Well that's a **cakewalk**!" Tad cried. "I must already know everything there is to know about the solar system, the moons and the asteroid belt and gravitational arcs . . ." Tad stopped and then got up and began backing away from the glares of his teammates. Then he turned and ran, with Caroline, Bert, and Maggie chasing him, laughing.

Glossary

abyssal	the ocean zone that covers the deep ocean floor; abyss means a bottomless depth (p. 8)
bathyscaphe	a small submarine used for extremely deep diving (p. 12)
cakewalk	something very easy to do (p. 23)
intimidating	frightening (p. 6)
ironic	the opposite of what is expected; in a story, a twist in which something turns out to be the opposite of what it seems (p. 23)
plumes	rising clouds (p. 16)
podium	a stand with a microphone for public speaking (p. 18)
seamounts	undersea volcanoes (p. 8)
sediment	sand, dirt, and soil in water (p. 10)
sloughed	shed; fallen off (p. 11)
submerges	sinks under the water (p. 8)
sullenly	sadly and angrily (p. 21)
theoretically	a technically correct idea that is impractical in real life (p. 7)
transparent	clear; see-through (p. 11)
trenches	cracks in the sea floor (p. 8)

Name _____

INSTRUCTIONS: Choose one of the characters from the story. Then choose three events from the story, and in the boxes below, write what that character's behavior showed about his or her personality.

Character Name

Event	What that showed about the character

Name _____

INSTRUCTIONS: Rewrite each sentence below, placing quotation marks and punctuation in the correct places. Make sure you use proper capitalization. Be sure to check if the dialogue needs a question mark or an exclamation point.

1. i think that's a good idea said mom i'll get started right away

2. oh no cried john it's going to collapse

3. no one is going to believe you jamie mumbled everyone knows ufos don't exist

4. but mom he wailed i want to go on the roller coaster again

5. did you send a thank you note i asked you should always thank someone even if you don't like the gift

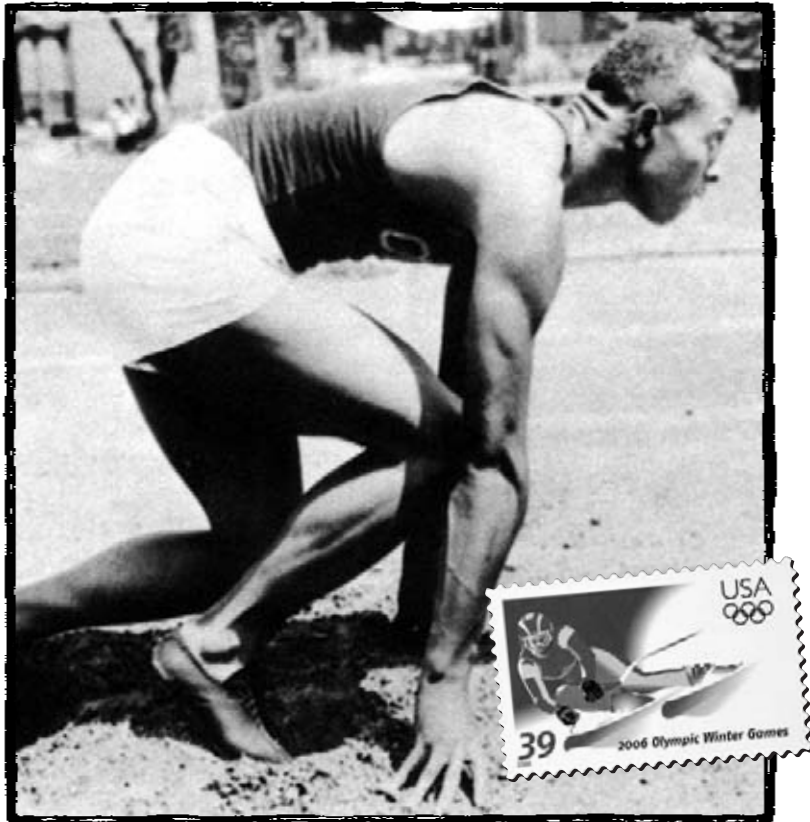
6. hey i found something tim shouted it looks like an old map

7. where did you say you put it asked dad i need that briefcase for my meeting

The Olympics: Past and Present

A Reading A-Z Level W Leveled Reader

Word Count: 2,270



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THE OLYMPICS: PAST AND PRESENT



Written by
Katherine Follett
and David Dreier

Illustrations by
Cende Hill

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María Colón, of Cuba, throws to win the women's javelin final. She set a new world and Olympic record of 68.40 meters on July 25, 1980.

TO BE THE BEST IN THE WORLD

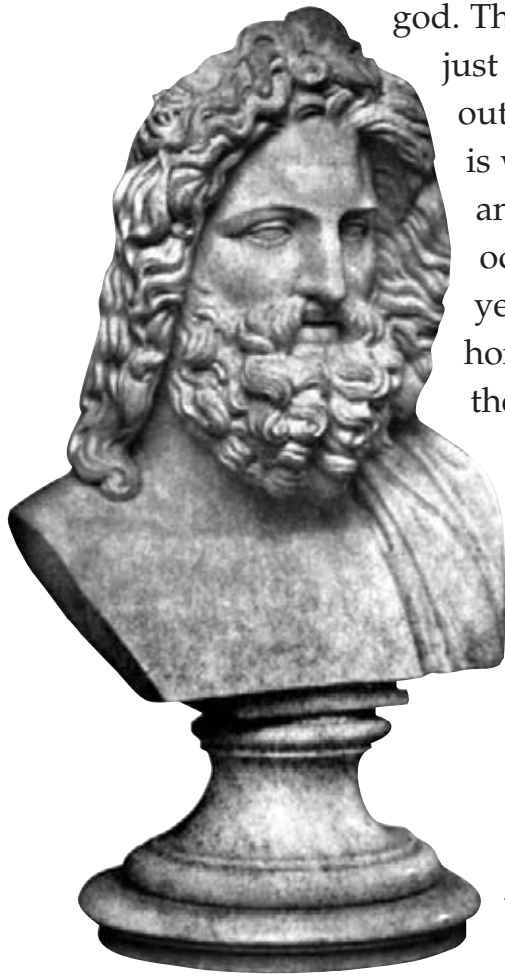
"Citius, Altius, Fortius." Those Latin words, meaning "Faster, Higher, Stronger," are the motto of the Olympic Games. Of course, that is the goal for all athletes: to be better than one's **competitors**. But for Olympians, it means even more. It means striving to be the best in all the world.

The Olympic Games are the largest and most famous **athletic** event in the world. Competitors from many nations come together to determine who is the best in a large number of events. In 2002, the Winter Games were held in Salt Lake City. In 2004, the Summer Games were in Athens. In 2006, the Winter Games are in Turin, Italy. Some of the events come from **ancient** contests of athletic abilities.

THE ANCIENT OLYMPIC GAMES

Some of the earliest records say that the first Olympics took place in Olympia, Greece, in 776 B.C., though many historians believe it was probably much earlier. The ancient Greeks actually held four different athletic competitions, one every year, and each one honored a different

god. The Olympics was just one competition out of the four. This is why each Summer and Winter Olympics occurs every four years. The Olympics honored the king of the gods, Zeus, who lived on Mount Olympus. Because Zeus was the most important god, the Olympics quickly became the most important athletic competition.



The god Zeus

At the earliest Olympics, only short footraces were held, but later, officials added boxing, wrestling, jumping, horse races, and discus and javelin throwing. Many of the events, including a race in which the runners carried heavy shields, were similar to military exercises. Thousands of spectators traveled across Greece to Olympia to see the Games.

The athletes trained for months, or even years, beforehand; and they were showered with glory when they won. Though the only official prize was a crown of olive leaves from a sacred tree, a champion also received money, goods, and fame from their home city-states. In these ways, the ancient Olympics were very similar to the modern Olympics.





Chariot races were often violent—some men died competing.

The ancient Olympics had other differences from the modern games. Only men were allowed to compete in the early ancient Olympics—women weren't even allowed to watch. Separate women's games began much later. The ancient contests were much more violent than today's events, meaning wrestlers could kick, punch, pull hair, and break bones; chariot racers could knock each other over; boxers wore no protective gear, and leather straps across their hands made the punches hurt much worse. Deaths were not uncommon. Also, ancient Greek athletes competed naked. This was partly because loose clothing could trip up an athlete, and partly because the Greeks liked to show off their bodies.

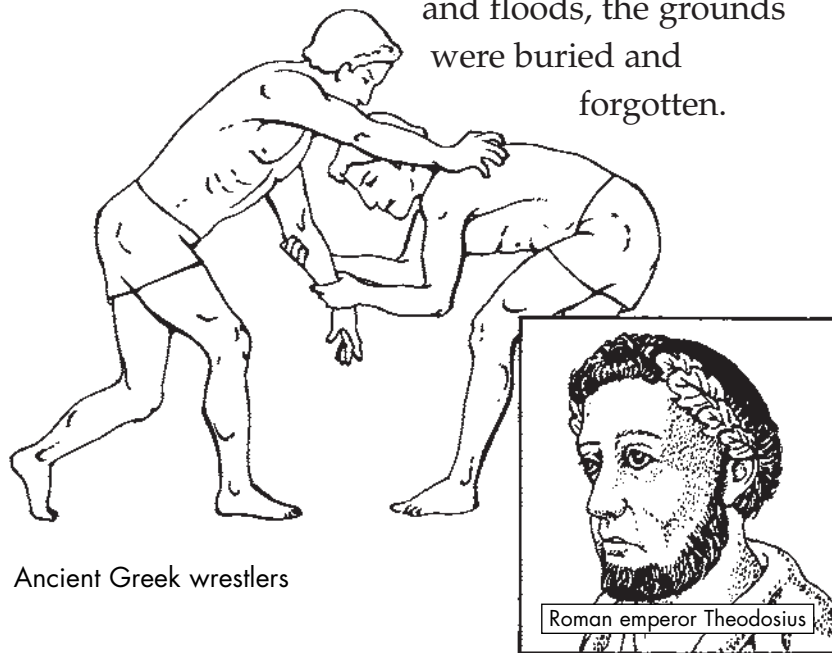


A diagram showing the layout of grounds in Olympia

There were many religious elements to the early Greek Olympics. There was a temple and an enormous gold and ivory statue of Zeus on the Olympic grounds. The ceremonies included a **procession**, or parade, of all the athletes and officials, followed by a sacrifice of as many as 100 oxen. Like today's Olympics, the ancient Greek Games were also a place for politics and business. The Olympic grounds had luxuries such as a hotel, a swimming pool, a sauna, a marketplace, and a bank in addition to the stadium, gymnasium, and horseracing arena.

The Greek games were wildly popular for hundreds of years. They provided a way for the city-states to compete with each other without going to war. In fact, during every Olympics, there was a strictly enforced **truce** that allowed athletes and spectators from all city-states to travel to and from Olympia in peace. Even after the Romans took over the Greek empire, the games continued. But in A.D. 393, the Roman emperor Theodosius (thee-uh-DOH-shee-us), a Christian, put an end to all **pagan** festivals, including the Olympics. Olympia and the Olympic grounds were abandoned, and after hundreds of years of neglect, war, earthquakes,

and floods, the grounds were buried and forgotten.



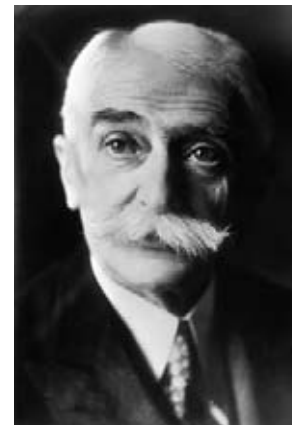
Ancient Greek wrestlers

Roman emperor Theodosius

THE OLYMPICS REVIVED

Though the site of the Olympics was lost, Greek writing and legends about the Games continued to fascinate historians. In the 1700s, archaeologists began searching for the lost Olympic grounds. By the 1890s, they had uncovered most of the major buildings at Olympia.

A Frenchman named Pierre de Coubertin (coo-ber-TAHN) was fascinated by the ancient Olympics. He liked the Greek idea of using sports to compete instead of warfare, and he thought that being athletic built character. Through a series of speeches and conferences, Coubertin promoted the idea of reviving the Olympics as a worldwide sports competition.



Pierre de Coubertin

People loved the idea, and the International Olympic Committee, or IOC, was formed in 1894.



Olympia stadium entrance



In 1948, the men's high diving champions received gold, silver, and bronze medals for first, second, and third place.

Coubertin had very strong beliefs about how the games should be run, and he hoped that the modern Olympics, like the ancient Olympics, would be a time of peace, when nations would put aside politics and warfare. He hoped that athletes would compete as individuals, instead of as part of a national team.

Coubertin was **adamant** that all of the athletes should be competing for the love of the sport, not for prizes or fame. So like the ancient Olympics, the modern Olympics would give out a **symbolic** prize, rather than money or goods. The IOC also made a rule that no professional athletes—athletes who had made money from performing their sport—could compete.

The first modern Olympics were held in Greece, home of the ancient Olympics, in 1896. Thousands of proud Greek citizens crowded into the rebuilt stadium to watch. Like the original Olympics, only men could compete in the 1896 games, but even so, there were 200 athletes from 14 countries. The men competed in track and field (running, jumping, and throwing), tennis, weightlifting, cycling, wrestling, swimming, and gymnastics. The winner of each event received an olive branch, a certificate, and a silver medal.

Olympics Trivia

The marathon race featured in the first modern Olympics comes from the story of Pheidippides (fie-DIP-ih-dees), a Greek soldier. After the Greeks won a great battle on the fields of Marathon, Pheidippides was told to run to Athens—over 40 kilometers (26 mi.) away—and tell the city about the victory. Pheidippides ran the entire way to the city, shouted out the news, and fell down dead of exhaustion. Modern marathons cover the same distance that Pheidippides ran.



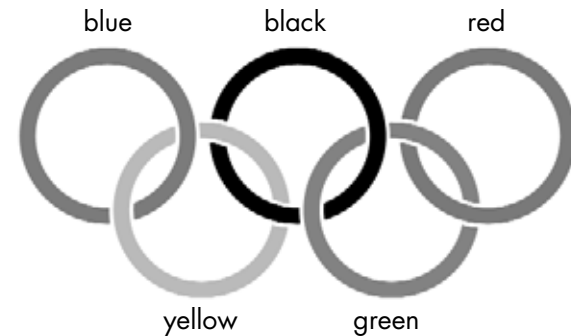
The next two Olympics, in Paris in 1900 and in St. Louis in 1904, were less successful. The events were spread out over many months, and they had to compete for an audience with the World's Fair, a large technology and cultural **exposition**.

Those Olympics were very different from today's. Almost all of the athletes were from Europe and the United States, and there were no official women's events (though women began competing in 1900). The host cities did not build Olympic grounds or "villages," so the athletes had poor housing and equipment, and many outdoor events were delayed or cancelled because of weather. There were few ceremonies like the ancient procession or the modern parade. There were no radio or television stations to broadcast the Games, so people took little notice. Still, the Games continued, slowly growing into the amazingly successful Olympics we know today.



Opening ceremony at the 1996 Olympic Games

The Olympic flag



Each ring represents a continent, and the connection of the rings represents how the Olympics brings the world together.

THE OLYMPICS EVOLVES

Every four years, the Olympics changed bit by bit, and at the tenth anniversary Olympic Games in Athens in 1906, athletes paraded around the stadium behind their nation's flag at the beginning of the competition. This parade, similar to the ancient Greek procession, has today become the **elaborate** opening ceremony with the traditional parade of nations. The Olympic flag, which is white with five colored rings, was first flown in 1920. The five rings represent the **unification** of the world, and at least one color on the flag can be found on the flags of every nation.

The first Olympic Winter Games were held in 1924 in Chamonix, France. More than 250 athletes from 16 nations, including 11 women, competed. There were 16 events, including speed skating, cross-country skiing, ski jumping, and ice hockey. An American, Charles Jewtraw, won the men's speed skating event, becoming the first person to win a gold medal in a Winter Olympics.

The Winter Olympics became very popular and were held every four years from then on in the same years that the Summer Games were held. One of the greatest competitors of the early Winter Olympics was figure skater Sonja Henie of Norway. Henie won gold medals in the 1928, 1932, and 1936 Winter Games.

The year 1928, when the world first took notice of Sonja Henie, was a milestone for female athletes. At the 1928 Summer Games in Amsterdam, the Netherlands, women were allowed to compete for the first time. After that, the number of sports in which women took part steadily increased.



Sonja Henie



Boxing champion Muhammad Ali lights the first torch to start the Olympic Torch Relay for the 2000 Olympic Games in Salt Lake, Utah.

Olympics Trivia

The Olympic torch has traveled not only by runners on foot, but by horse, by plane, by camel and more. Most amazingly, the Olympic torch has traveled under water! For the Olympics in Sydney, Australia, in 2000, a diver carried a special torch under water at the Great Barrier Reef. Each Olympics, a theme is chosen that determines the route of the torch and honors the spirit of the Games.

The first Olympic torch was lit in 1928, and in 1936 the running of the torch began. To honor the origin of the Games, the torch is lit using magnified sunlight in Olympia. Runners carry the torch from Olympia to the host city, passing it from one runner to the next. At the opening ceremonies, a special guest, often a former Olympic champion, uses this torch to light a larger Olympic torch, which burns throughout the Games.

In the 1960s, the Games began to be broadcast on television. Advertisers began putting their logos on equipment. The IOC still raises large sums of money for the Games through companies who pay for the right to put the Olympic logo on their products, such as cereals and candy bars.

The number of total sports events has grown with each Olympics. It is up to the IOC to decide which sports will be allowed in the Olympics. The committee has added new events in almost every Olympics as various sports have become popular. For example, snowboarding was added to the Winter Games in Nagano, Japan, in 1998.

By that time, the scheduling of the Olympic Games had changed. After the 1992 games, IOC officials decided to start holding the Summer and Winter Games in different years, two years apart. So in 1994, Winter Games were held in Lillehammer, Norway. They were followed in 1996 by Summer Games in Atlanta, Georgia.

The IOC has made other important changes as well. It slowly relaxed the rules that kept out professional athletes. This was most apparent in 1992, when the USA basketball “Dream Team,” including pro stars Michael Jordan, Magic Johnson, Larry Bird, and Patrick Ewing, easily won the gold medal.



Jesse Owens, at the Berlin games

While everyone hopes that the Olympics will be peaceful, war and politics have interfered. Three Olympics, 1916, 1940, and 1944, were cancelled because of World Wars I and II. At the 1936 Berlin Olympics, the ruling Nazis wanted to prove that white Germans were a superior race. They spent millions of dollars promoting their racist ideas, but they were humiliated by the amazing gold-medal performance of runner Jesse Owens, an African American.

In 1972, members of a Palestinian group kidnapped nine athletes from Israel’s Olympic team. Seventeen people were killed in the kidnapping and in the failed rescue attempt. South Africa was banned from the Olympics for many years because of its racist **apartheid** policy. The United States and the Soviet Union refused to attend games in the 1970s and 1980s because of tensions between the two nations.

TODAY'S OLYMPICS

The Olympics have come a long way since their modern beginnings. Besides growing into a huge spectacle, they have become enormously competitive. Most athletes who won gold medals in the early games would not even make it to the Olympics of today. Consider, for example, cross-country skiing. In 1924, the winner of the men's 50-kilometer (31-mile) cross-country ski race finished in about 3 hours and 45 minutes. In the 2002 Winter Games in Salt Lake City, Utah, the gold medal winner in that event, Johann Muehlegg of Spain, had a time of just over 2 hours and 6 minutes.

Think About It

Will athletes keep breaking records forever?



Spaniard Johann Muehlegg races in the 2002 Winter Games in Salt Lake City, Utah.

In order to compete at the Olympic level today, athletes must train as never before. This doesn't just mean keeping to a strict training schedule. To be contenders for medals, Olympic athletes must now use the latest equipment and hone their skills at world-class training centers. The United States Olympic Committee operates three such centers in Lake Placid, New York; Colorado Springs, Colorado; and Chula Vista, California.

Olympic competition is so stiff that many athletes think they need even more of an edge. In recent decades, many Olympic athletes have secretly used banned drugs that improve athletic performance. Because the use of prohibited drugs was giving the Olympics a bad image, the IOC began taking steps to stop the practice.



Florence Griffith-Joyner, or "FloJo," holds two world records, one in the 100-meter race, the other in the 200-meter race.

Since the mid-1970s, Olympic officials have routinely tested athletes for drug use. Olympic champions who fail a drug test can be stripped of their medals. In 2002, for example, testing revealed that Johann Muehlegg had been using a drug that increases the production of red blood cells. As a result, he lost his gold medal in the 50-kilometer cross-country ski race.

There have been other **controversies** as well. Many people have questioned whether judges in sports such as figure skating and diving give advantages to athletes from their own countries.

But the largest change in the Olympics is that each one becomes bigger and more popular—the 2004 Summer Olympics included the most athletes, the most events, the most nations, and the most spectators. Every two years, the athletic competition gets better and better. Few Olympics pass without world records being broken.

The IOC awarded Canadian figure-skating pair Jamie Sale and David Pelletier gold medals in 2002 after a judge from France broke IOC rules.



Despite their problems, the Olympics continue to be the greatest show on Earth. Generally, more than 11,000 athletes from about 200 nations participate in the Summer Games. They compete in some 300 individual and team events. Summer Games can start as early as July or as late as October. The next Summer Games are planned for August 2008 in Beijing, China.

The Winter Olympics are smaller than the Summer Olympics. More than 2,000 athletes participated in the 2002 Winter Games in Salt Lake City. Events included downhill skiing, speed and figure skating, ice hockey, bobsled racing, and more than 60 other events. The Winter Games are almost always held in February. The next Winter Games are going to be held in Turin (Torino), Italy, in February 2006.



Italian Dany Locati competes in the skeleton, a sport that reappeared in the Winter Games in 2002 after a 54-year absence.

GLOSSARY

adamant	to not give in to pressure (p. 11)
ancient	from a very long time ago, very old (p. 4)
apartheid	a strict policy to keep races separate in South Africa (p. 18)
athletic	strong and active (p. 4)
competitors	people or teams that take part in contests (p. 4)
controversies	arguments about what is right (p. 21)
elaborate	having lots of parts and details (p. 14)
exposition	international event to explain how people and things work (p. 13)
pagan	relating to non-Christian religions of Greece and Rome (p. 9)
procession	an orderly, formal parade (p. 8)
symbolic	representing an idea (p. 11)
truce	an agreement to not fight (p. 9)
unification	bringing together a large number of countries (p. 14)

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Name _____

INSTRUCTIONS: Before reading the book, answer "Yes" or "No" to each question. After reading the book, answer the questions again and compare your answers.

 KNOWLEDGE SURVEY

YES = I AGREE WITH THE STATEMENT.

NO = I DO NOT AGREE WITH THE STATEMENT.

BEFORE READING	THE OLYMPICS: PAST AND PRESENT	AFTER READING
	The summer Olympics are held every four years.	
	The Olympics began in ancient Greece.	
	The first record of the Olympic Games was made in 776 B.C.	
	Only men competed in the ancient Games.	
	The modern-day Olympics began in 1896.	
	Wars and political unrest have affected the Games.	
	Olympic medal winners can earn lots of money.	
	Winners of the Olympic Games in ancient Greece were given crowns made of olive leaves.	

THE OLYMPICS: PAST AND PRESENT • LEVEL W • 1

SKILL: PRIOR KNOWLEDGE

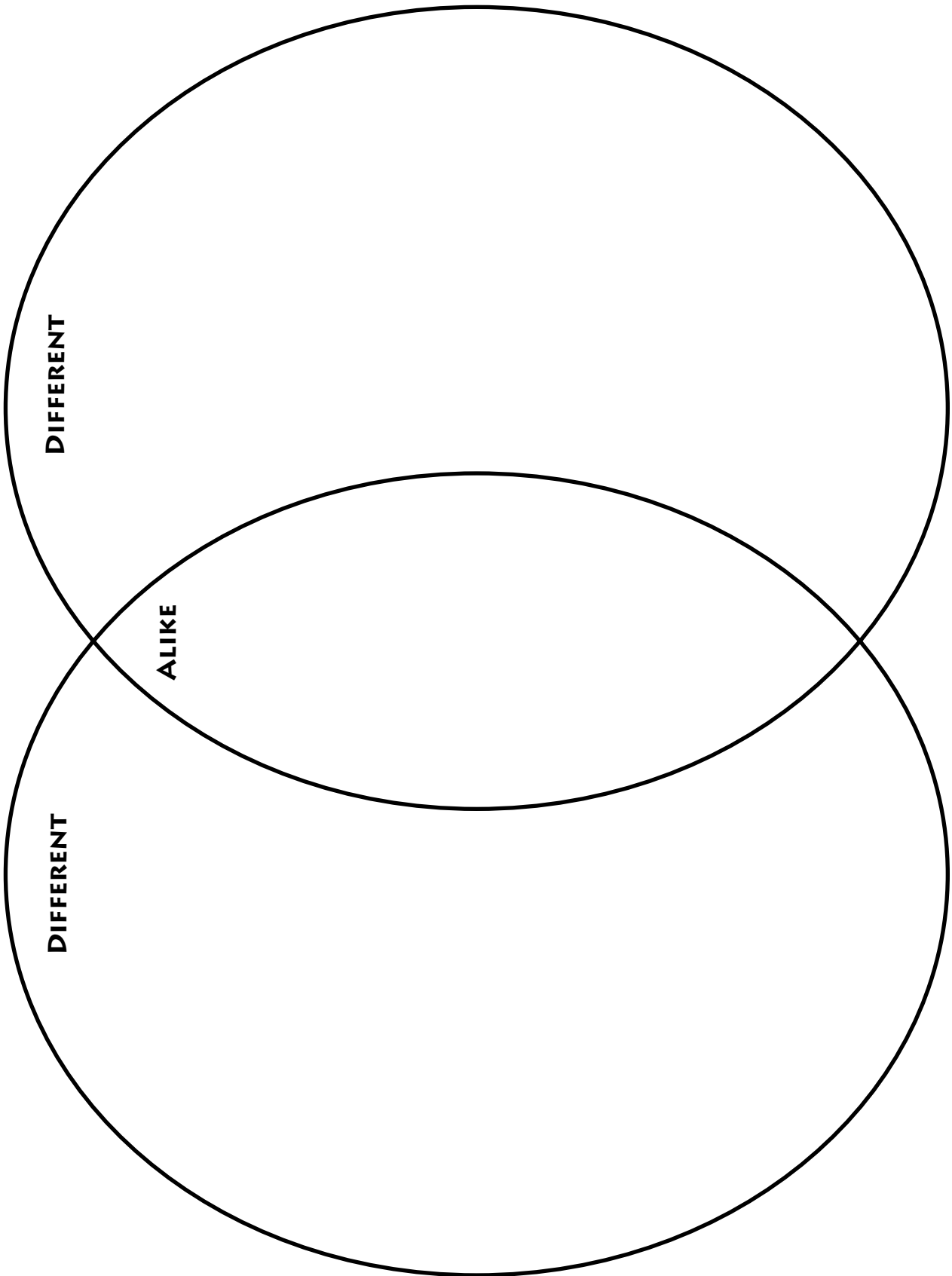


Name _____

INSTRUCTIONS: Write the two topics you are comparing. Write details that tell how the topics are different in the outer circles. Write details that tell how the topics are alike where the circles overlap.

TOPIC: _____

TOPIC: _____



Name _____

INSTRUCTIONS: Match each present-tense word with the irregular past-tense equivalent. Then use each word in a sentence. The first example is done for you.



PRESENT-TENSE

write
buy
fly
take
go
think

PAST-TENSE

thought
took
went
flew
bought
wrote



1. I like to write letters to my grandma.
I wrote a letter to her last week.

2. _____

3. _____

4. _____

5. _____

6. _____

Name _____

INSTRUCTIONS: Locate each word in a dictionary. Read the definitions for each multiple-meaning word. Choose two of the meanings and use each one in a sentence. You may add suffixes such as *-ed*, *-s*, or *-ing* to the word. The first example is done for you.

1. (face) Face the camera and smile!

My eyes are located on my face.



2. (fall) _____

3. (kind) _____

4. (park) _____

5. (right) _____

6. (trip) _____

Mapping the Woods: Maps and Cartography

A Reading A-Z Level W Leveled Reader

Word Count: 2,069




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Illustrated by Paula Schricker

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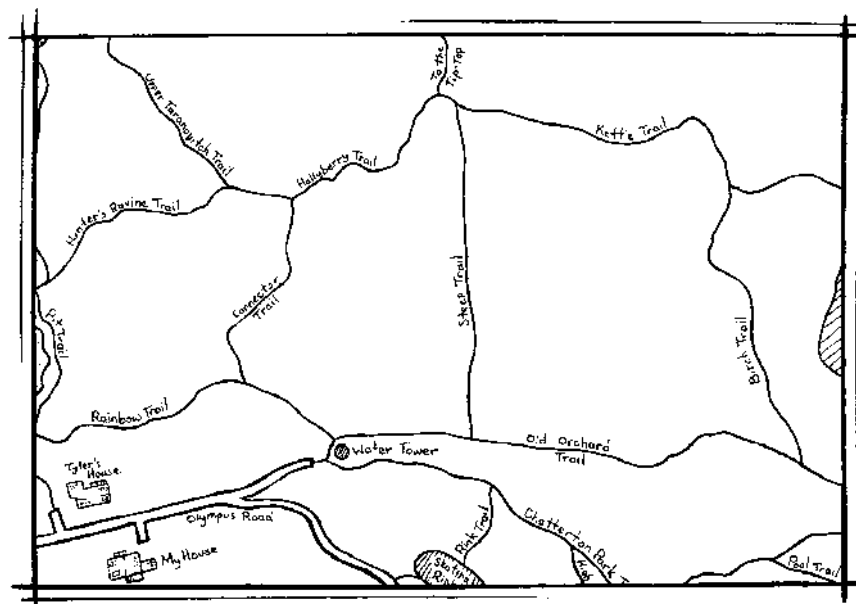
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Maps and What They Do

This is a map I drew of the woods that are by my house. The map shows the trails, roads, and buildings near my house. Be sure you have a copy of my map to follow along as you read this book.

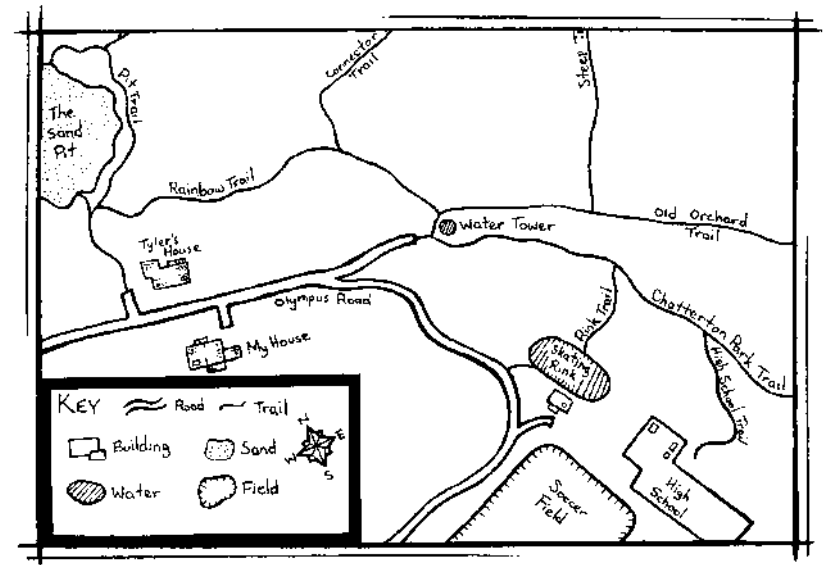
A map is a drawing of an area. It shows where things are in relation to each another. Most maps show an area from above, as though you were looking down from an airplane. In fact, that's how most maps are drawn today. Someone takes a photograph from an airplane or satellite, and then a mapmaker, or **cartographer** (car-TOG-ra-fer), uses that photograph to draw a map.

Before there were planes or spaceships, people drew maps by carefully remembering where things were, how far away they were from each other, and which direction they were from each other. Maps were also made by **surveying**, or taking mathematical measurements of how far and in which direction things were from each other. Many small maps are still made by surveying. Surveying creates an accurate map, though it takes a long time to survey a large area.

I drew my map by remembering and guessing where everything was—it was very hard to do. Some things still might be the wrong size. But if you were lost on the trails by my house, you could use this map to find your way out.



This cartographer is using computer software to draw a map.



What Is on a Map?

The Key

Most maps aren't an exact drawing of the way an area looks. For instance, I didn't draw the trees, grass, or buildings as they would look in a photo or painting. Cartographers use symbols so that their maps are easy to draw and read. Most maps have a box in the corner, called the **key**, that tells you what each symbol means.

The key on my map tells you the symbols I used to draw the woods and my neighborhood. The double lines are roads where cars drive. The single lines are walking trails. The boxes are buildings, and the slanted lines show water areas.

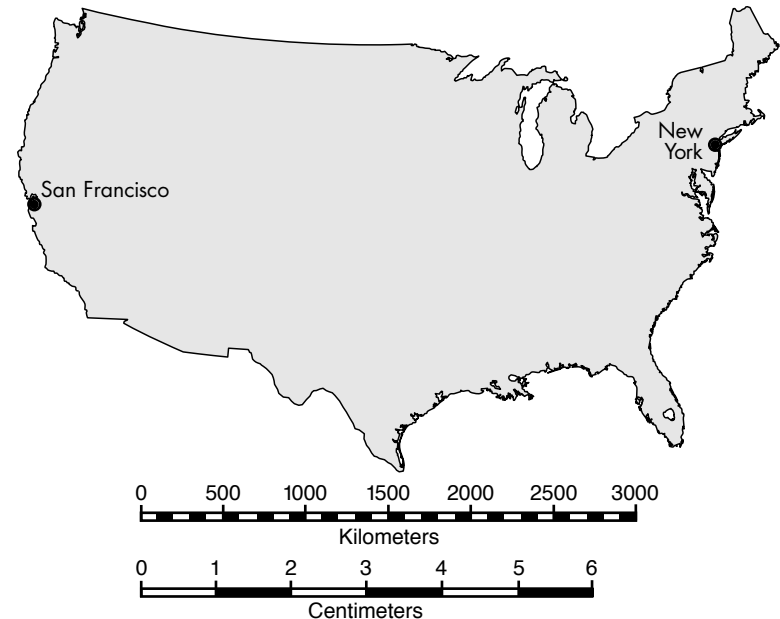


A four-pointed star called the **compass rose** inside the key tells you where north, south, east, and west are on the map. Most maps put north at the top, south at the bottom, east on the right, and west

on the left. As you can see from my compass rose, my map is drawn with northeast at the top. I did this because my house faces northeast, so that is how I think of my neighborhood.

Most maps show the names of cities, roads, trails, and other geographical features such as rivers and oceans so that you can quickly tell where things are. I put the name of each trail, road, and building on my map. Look at my map and see if you can find the Hunter's Ravine Trail and the high school.

Some planes have GPS tracking devices in them so you can see where you are during the flight.



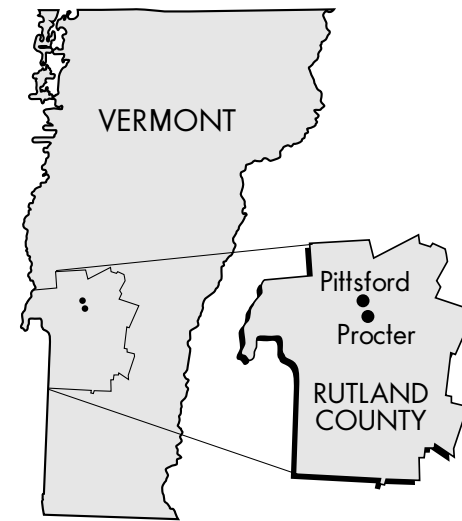
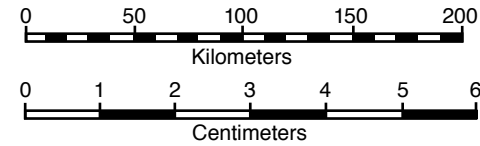
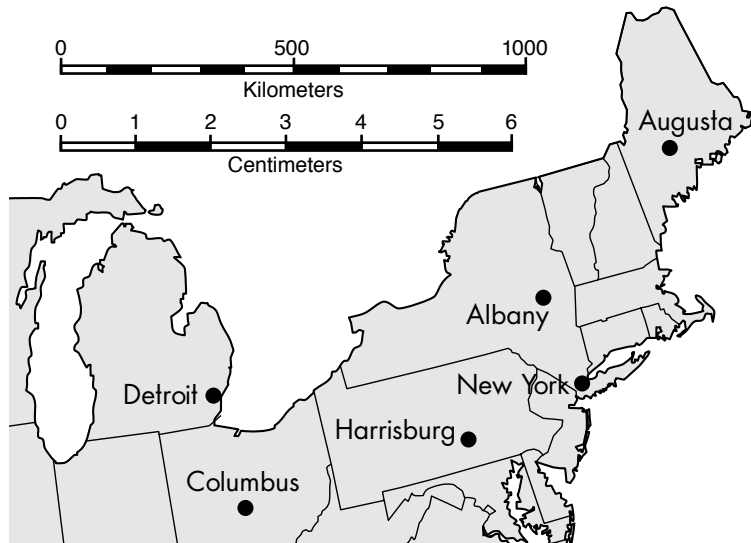
Scale

The **scale** of a map tells you how big the map is compared to the actual area. Most maps show the scale by comparing two units.

On this map of the United States, the scale units are shown on a bar with marks and numbers on it. The top scale tells you the distance in the actual area. The bottom scale shows the distance on the map; this map is measured in centimeters. For example, on this map one centimeter is equal to almost 500 kilometers of actual distance.

Can you imagine if a map of the entire United States were drawn in the scale of my map of the woods? The map would have to show every single building in the United States, plus all of the spaces in between. It would be hundreds of kilometers wide—certainly too big to fold up and put in your pocket. If a cartographer draws a big area, he or she makes the map in a smaller scale. This map of the United States is in a very small scale.

If a map zooms in on a smaller area, the scale gets bigger and bigger. This map shows the northeastern part of the United States, where my woods are. The area is about four times smaller than the United States, so the scale is four times bigger.



This is the state of Vermont. And here is a map of the county, or part of the state, where I live. Notice how the top numbers on the scale get smaller and smaller as the area shown on the map gets smaller and smaller.

Try This

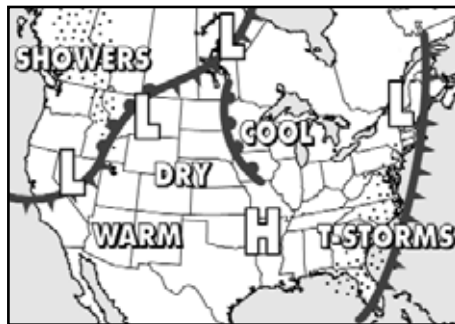
Distance and Area

- ① Measure the number of centimeters between New York and San Francisco using the map on page 8.
- ② How many kilometers does each centimeter represent? Multiply your measurement by that number.
- ③ How far is it from New York to San Francisco?
- ④ Measure the length of the state of Vermont in centimeters on this page. Using the scale on the map, figure out how many kilometers Vermont is long.
- ⑤ Measure the width of the state. Since the width changes from top to bottom, measure in the middle to get an average width. Use the scale to figure out how wide Vermont is.
- ⑥ Multiply the length times the width. About how big is Vermont in square kilometers?

Landmarks and Symbols

Maps often show where important objects or things are. A **landmark** is an object that is special, important, or helps people find their way. It can also be something you might want to find if you were using the map. One landmark on my map is the water tower. When I see the water tower, I know I am close to my road. On many city maps, landmarks are important buildings, such as schools, hospitals, and courthouses.

Most important objects are shown using symbols. For instance, my water tower is drawn as a circle with slanted lines across it. On a city map, a hospital might be a blue or red cross. Symbols can also show important areas, events, or things that you can't see. On a historical map, a drawing of an explosion or gun might show where a battle took place. On a weather map, a blue line with triangles represents colder weather moving in. Use the key to help you understand



the symbols and identify the objects.

H	high pressure	K E Y
L	low pressure	
	cold front	
	warm front	
	precipitation	

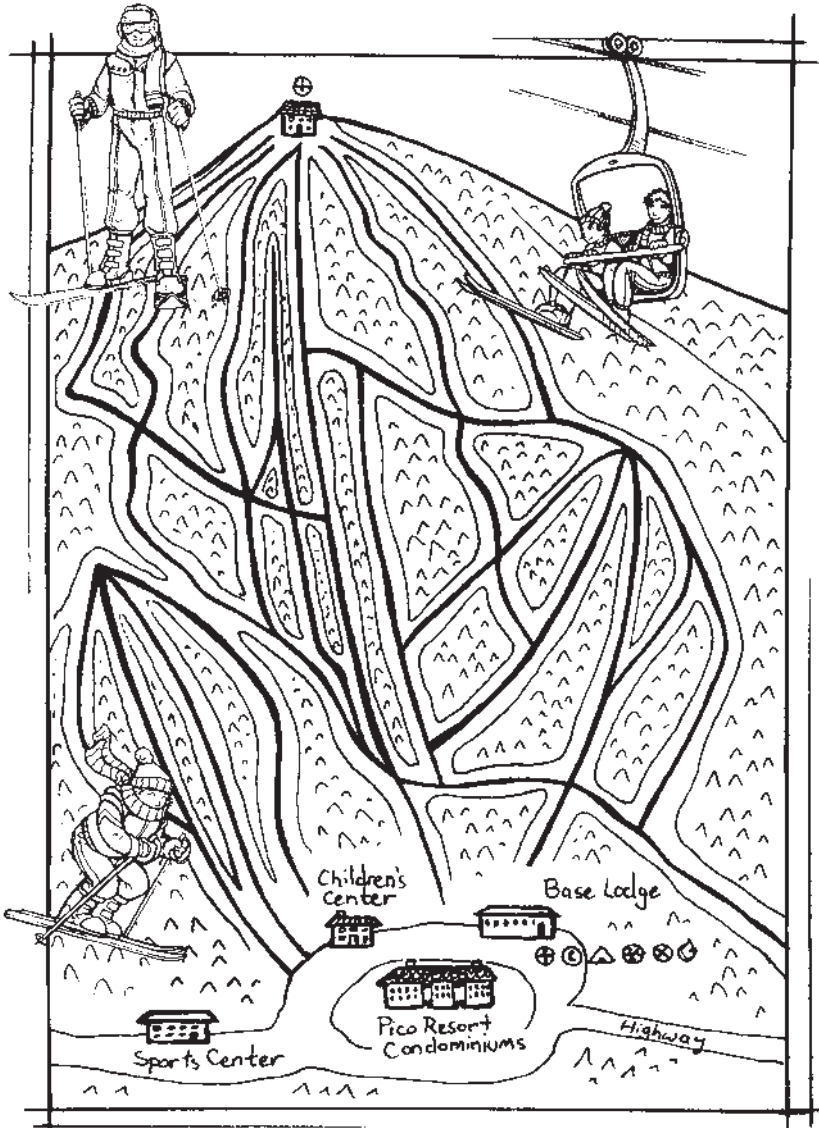
Types of Maps

The information on a map depends on what the map is used for. If you are using a map on a boat trip, then the map needs to show rivers, lakes, and oceans, but it doesn't need to show things on land. If you are using a map on a car trip, then the map needs to show roads, towns, and cities, but it doesn't need to show farms, forests, or hiking trails.

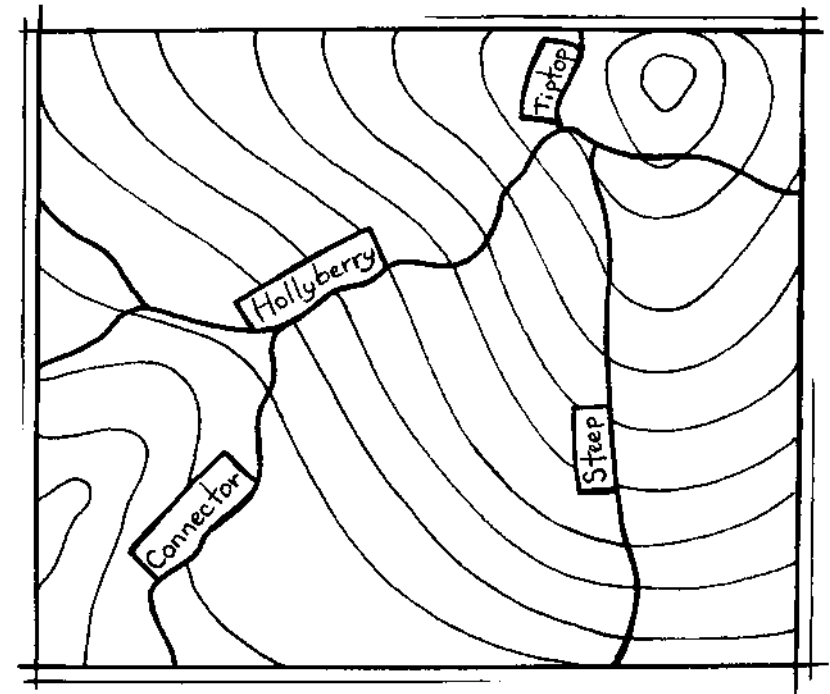
There are three basic kinds of maps: physical, political, and data. Physical maps show natural things, such as rivers, mountains, plants, and weather. Political maps have to do with people. They show roads, cities, buildings, countries, and other human-made things. Some maps show a mix of the two. For example, the **pictorial map**, or map made with pictures instead of symbols, on the next page shows a ski area at the top of a small mountain. The map shows buildings, such as ski lodges, and areas of woods where it is not safe to ski. Both kinds of information, political and physical, are important to skiers.

The third kind of map, a data map, is used for showing information, especially information given in numbers, which is called statistics.

On the next few pages, I will use my map to show you different kinds of maps and how to use them.



Killington/Pico Ski map



Physical Maps

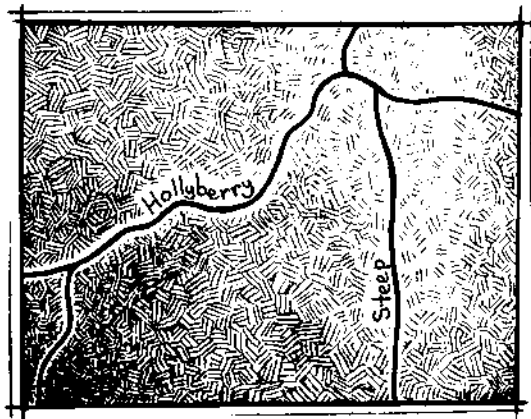
Topographic Map

One common physical map is a **topographic** map. It shows **elevation**, or how high or low the land is. Each line is one unit, such as one meter, higher or lower than the one next to it. When the lines are close together, the land is rising or falling steeply. When they are far apart, the land is flat. I turned part of my map into a topographic map that shows you where the land rises and falls, giving you a sense of the shape of the small mountain where my woods are.

Topographic maps are good for going out into the wilderness, where there are no roads or signs. Let's say you got lost in the woods near Hunter's Ravine Trail. Using my map, how could you find your way back to Pit Trail? Without a compass or compass rose to tell which way was north, it would be very hard to know where to go with just a trail map. But with a topographic map, you could match the shape of the land to the shape on the map, to get an idea of where you are depending on the direction you are walking.

Relief Map

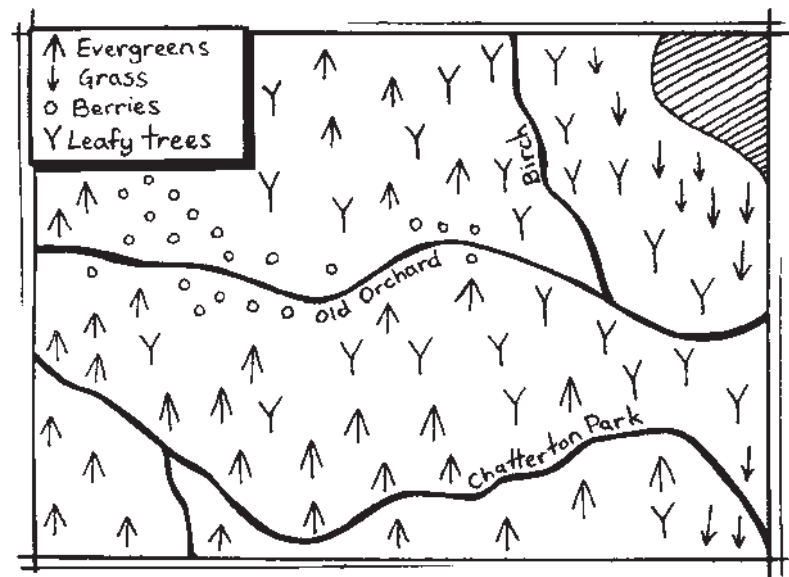
Other kinds of maps show elevation. **Relief** maps use colors to show how high or low things are. They usually use light colors to show high areas and dark colors to show low areas. Here, I shaded part of my map to make it a relief map. You probably have seen a relief map of the world that shows major mountain chains. Other relief maps show imaginary shadows made by mountains and valley walls.

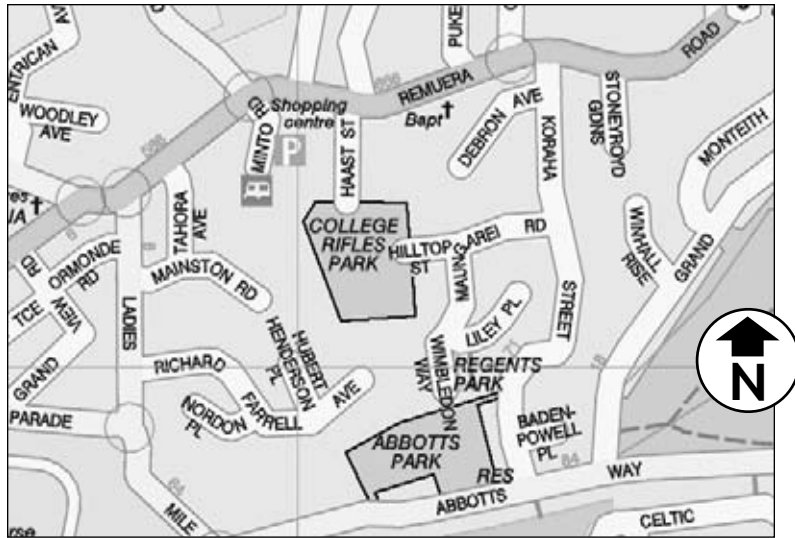


Vegetation Map

A vegetation map shows what kinds of plants grow where. It uses different colors or patterns to represent different kinds of plants. I colored my map so that it shows you where there are grass, shrubs and bushes, evergreen trees, blackberries, or trees that lose their leaves, such as maples and birches. You can use the key to tell which pattern is which. Can you use the map below to find the spots along Old Orchard Trail where there are berries?

Other vegetation maps show where crops grow, such as corn or apples. What kind of trees line both sides of Birch Trail?



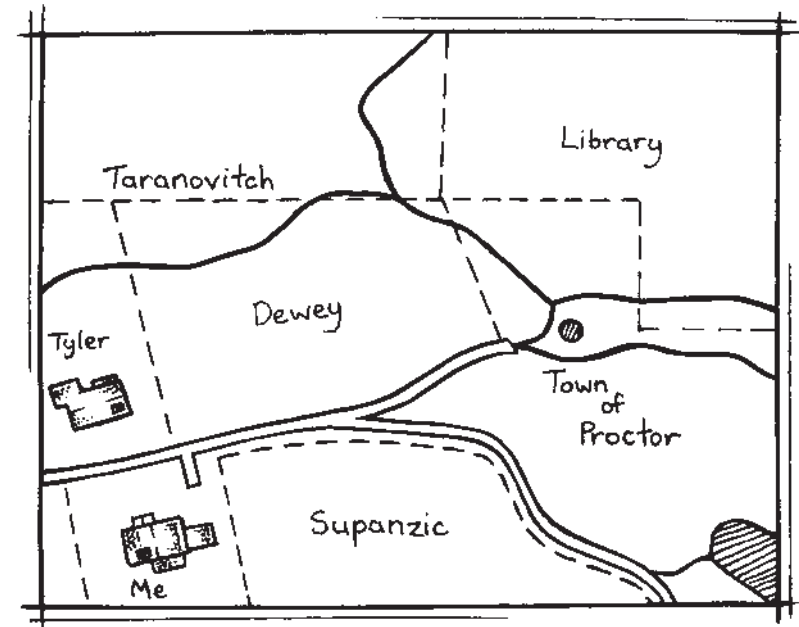


Political Maps

Road Map

A road map shows roads and where they go, and it is best for finding your way from one place to another. Here is a road map of part of the city of Auckland, New Zealand. How might you walk from the College Rifles Park to the Abbotts Park? How many times would you turn, and in which direction? You could use this map to help you find your way around if you ever went to Auckland.

My map of the woods is a kind of road map. It shows paths where you can go from one place to another. Use my map to figure out how to get from the water tower to Mr. Taranovitch's field.



Boundary Map

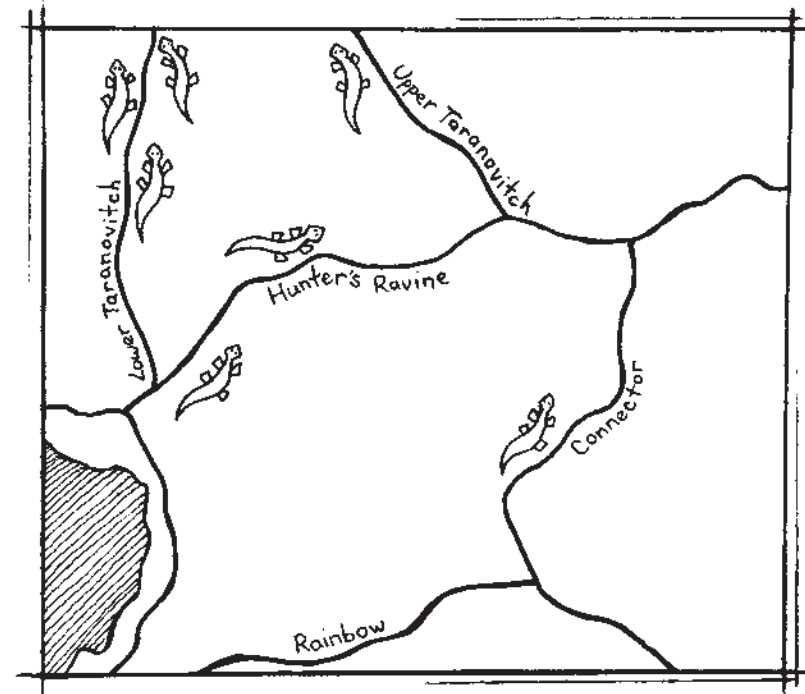
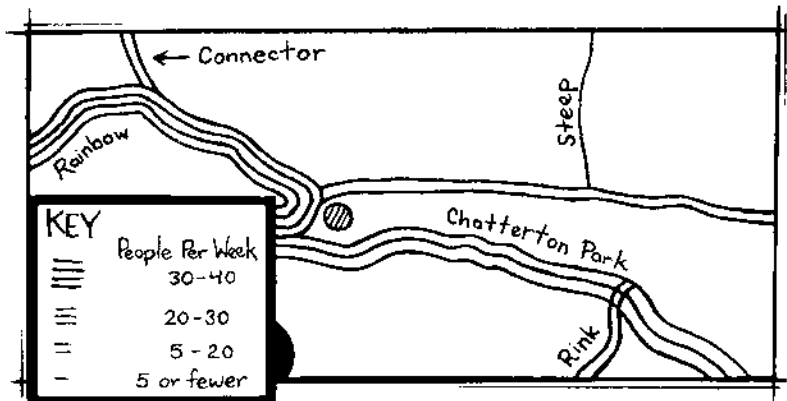
A boundary map shows who controls the land or to whom it belongs. A boundary map of the world shows the countries. A boundary map of the U.S. shows the individual states or counties. On this page, I made my map into a boundary map. Now it shows who owns the land.

A boundary map helps people know how they can use the land and who might be there. Parts of the woods belong to Mr. Taranovitch, who doesn't like people to go hunting on his land. Hunters could use this boundary map to know where they are not allowed to hunt.

Data Maps

A data map is any kind of map that shows information in the form of numbers. You may have seen a data map on the news that showed how people voted in different areas. You may also have seen a data map on the weather report that showed how many centimeters of rain fell in different areas. Data maps can show natural or human information.

On this version of my map, I changed the way I drew the trails to show how many people use each path. Four lines mark trails where 30 to 40 people go each week. One line marks trails where 5 or fewer people go each week. Use the key to see how the other trails are drawn. You could use this data map to estimate which trails have the most erosion, or to plan a walking trip on which you wouldn't run into many other people.



On this version of the map, I used a drawing of a newt to show how many red newts I see in different areas. Each drawing represents five red newts. You could use this map to see if the population of red newts is rising or falling. You could also use it to pick walking trails where you could see many red newts.

Data maps can represent almost any kind of information. Look in newspapers, magazines, and on the Internet to find different kinds of data maps. Remember to look at the key to see what each color or symbol means.



This backpacker uses a map to find his way around.

Bon Voyage!

Maps can tell you many things about a place without your ever having to visit it. Some maps help you find your way around, while others tell you what you might see. There are as many kinds of maps as there are places on Earth and things to see. Check out some maps around you. You can plan a wonderful journey, whether it is a real trip or just an adventure in your mind.

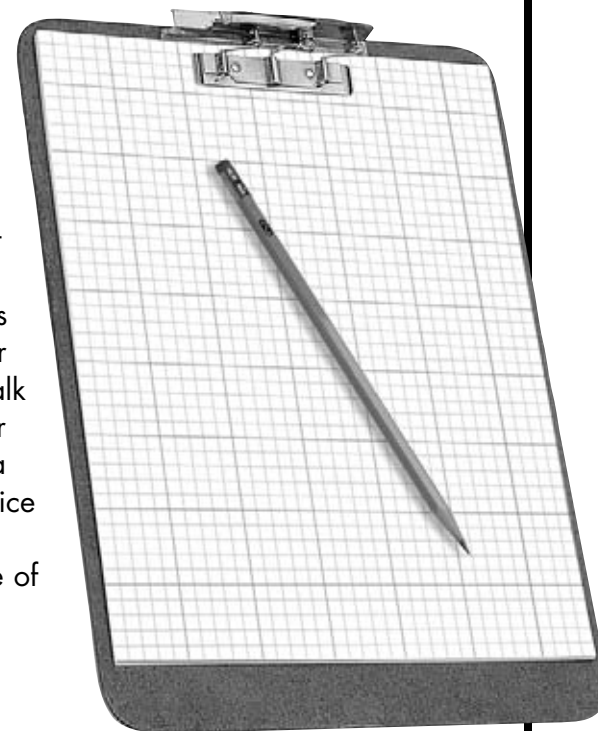
Try This

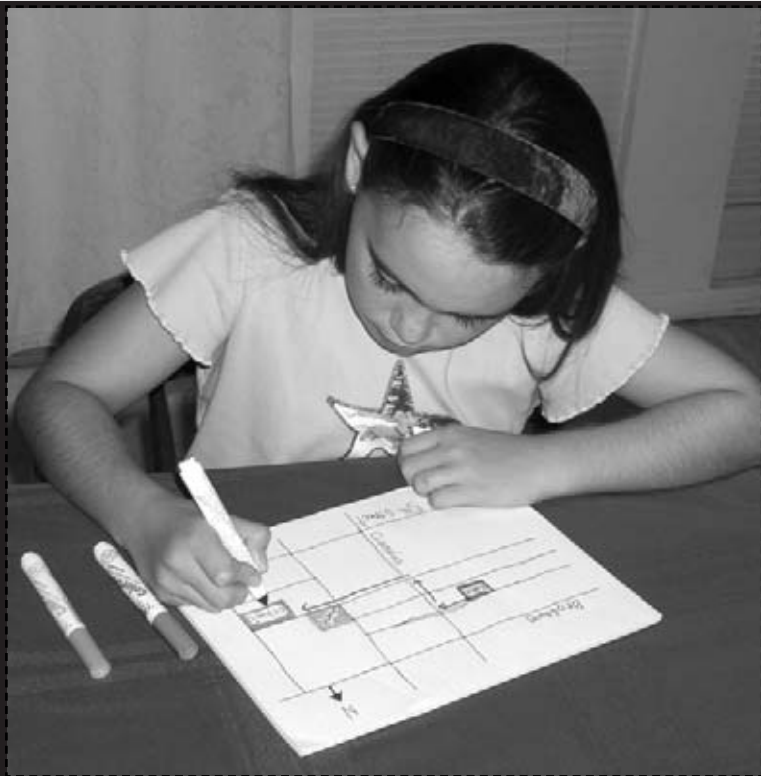
Make a Map

Try to draw a map that shows the route you take from your home to an important place, such as your school, the snack bar, or a friend's home.

What you need: graph paper, a pencil with an eraser, and something to write on.

- ① Draw your home. Use a symbol, such as a square, or a picture of your home.
- ② Begin walking toward your important place. Draw a line away from the picture of your home, going in the same direction you walk.
- ③ Try to estimate distance by counting how many steps or minutes it takes to go down the first street. If it takes twice as many steps or minutes to walk down another street, draw a line that is twice as long. Use another piece of paper if you need to.





- 4 Notice the kinds of corners you turn. Draw a line that makes the same kind of corner in the same direction.
- 5 Write the name of each street on your line as you walk down it. Draw landmarks, such as a church, a special tree, or a familiar store.
- 6 Draw your important place when you reach it.
- 7 Use markers and crayons to color your map and add more details.

Try giving your map to a friend or a family member. Challenge that person to find his or her way to your important place.

Glossary

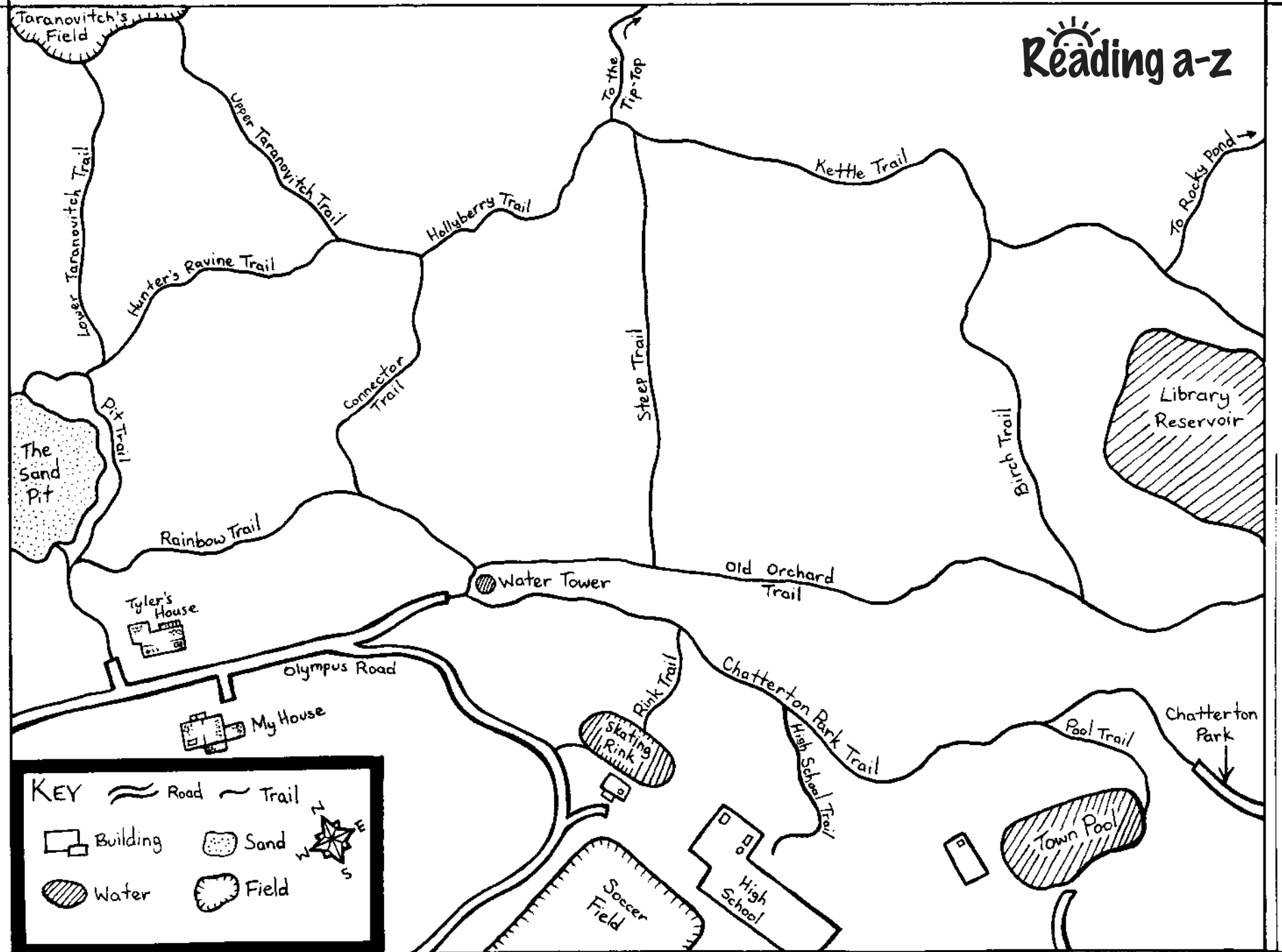
cartographers	mapmakers (p. 4)
compass rose	a pointed symbol that shows where the directions are on a map (p. 7)
elevation	height of the land (p. 14)
key	the part of the map that explains what the symbols and colors mean (p. 6)
landmarks	objects that help you find your way (p. 11)
pictorial map	map with pictures rather than symbols (p. 12)
relief	map that uses colors or shades to show elevation (p. 15)
scale	the size of one thing compared to the size of another; on a map, how big the area is compared to the map (p. 8)
surveying	mathematically measuring the distance and angle between objects (p. 5)
topographic	map that uses lines to show elevation (p. 14)

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My Map by Rachel Lawson (supplemental)

Reading a-z



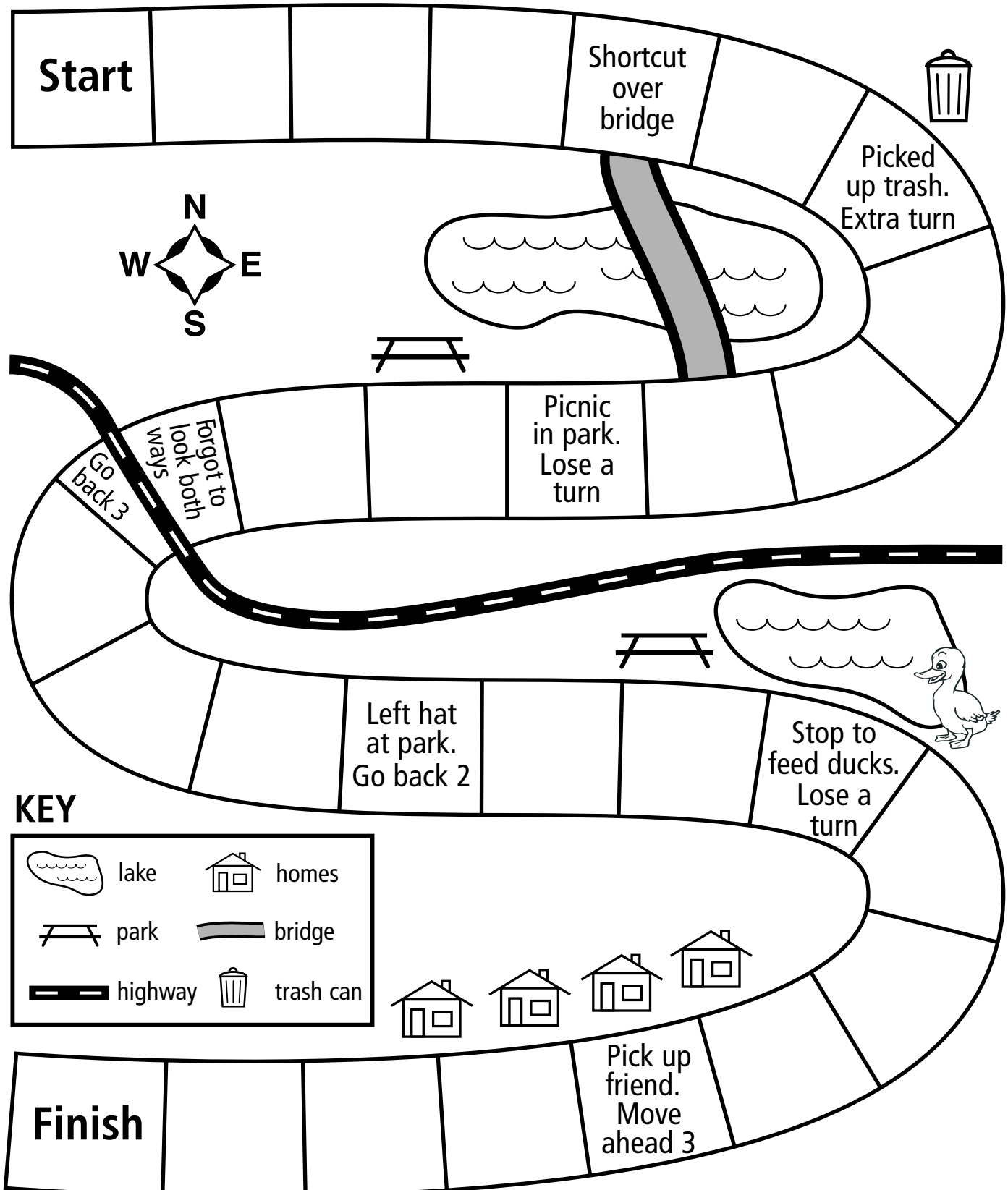
Name _____

INSTRUCTIONS: Write the main ideas and important details for each of the chapter sections listed on the chart.
Draw an example of each.

Chapter and Section	Main Idea	Important Details	Example
What Is On a Map? The Key			
What Is On a Map? Scale			
Types of Maps Physical Maps			
Types of Maps Data Maps			

Name _____

INSTRUCTIONS: Play the game with a partner. Have your teacher copy the two pages of game cards back to back. Cut out the cards and place the cards definition side up in a stack. Draw a card, read the definition, and guess the word. Turn the card over to see if you are correct. If correct, you can move the number of spaces on the game board indicated on the card. The first person to cross the finish line wins the game.



Name _____

Height of the land	On a map, the size of one thing compared to the size of another thing	Mapmakers
The part of the map that explains what the symbols and colors mean	A map that uses lines to show elevation	Maps that use colors or shades to show elevation
A map with pictures instead of symbols	Mathematically measuring the distance between two objects	A pointed symbol that shows where the directions are on a map
Objects that help you find your way	Information in the form of numbers	A compass rose might show these four directions

Name _____

Answer: Cartographers Move forward 6 spaces	Answer: Scale Move forward 3 spaces	Answer: Elevation Move forward 5 spaces
Answer: Relief Maps Move forward 4 spaces	Answer: Topographic Move forward 6 spaces	Answer: Key Move forward 3 spaces
Answer: Compass Rose Move forward 5 spaces	Answer: Surveying Move forward 6 spaces	Answer: Pictorial Map Move forward 4 spaces
Answer: North, south, east, west Move forward 3 spaces	Answer: Statistics Move forward 5 spaces	Answer: Landmarks Move forward 4 spaces

Atlantic Crossing

A Reading A-Z Level W Leveled Reader

Word Count: 2,165

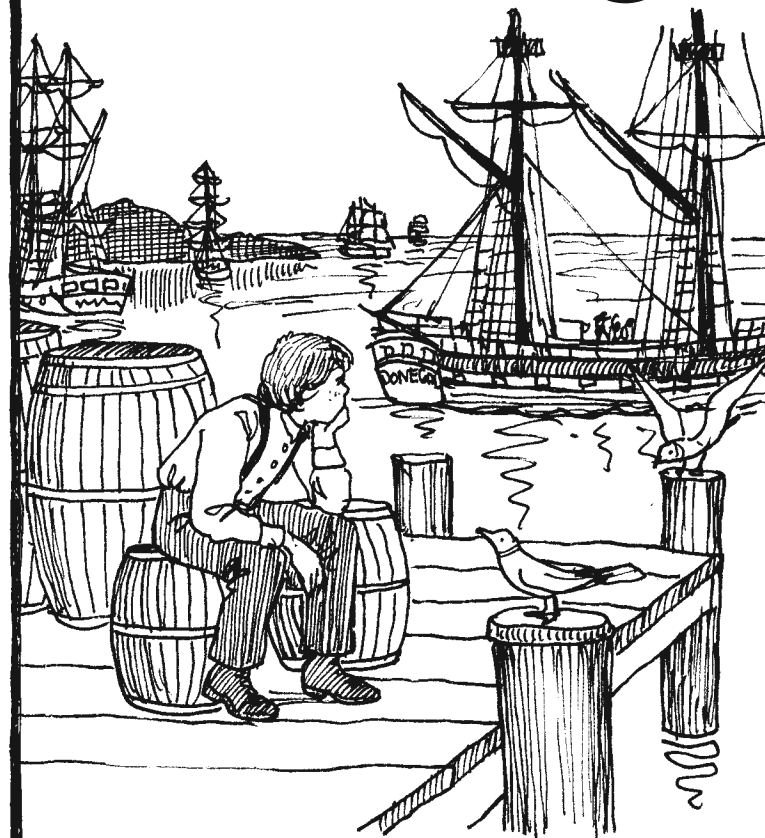


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Atlantic Crossing



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Correlation

LEVEL W

Fountas & Pinnell	S
Reading Recovery	26
DRA	44

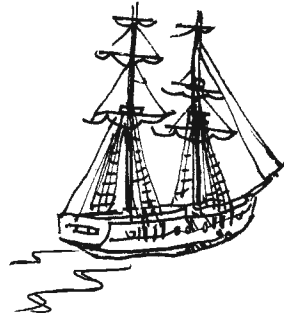
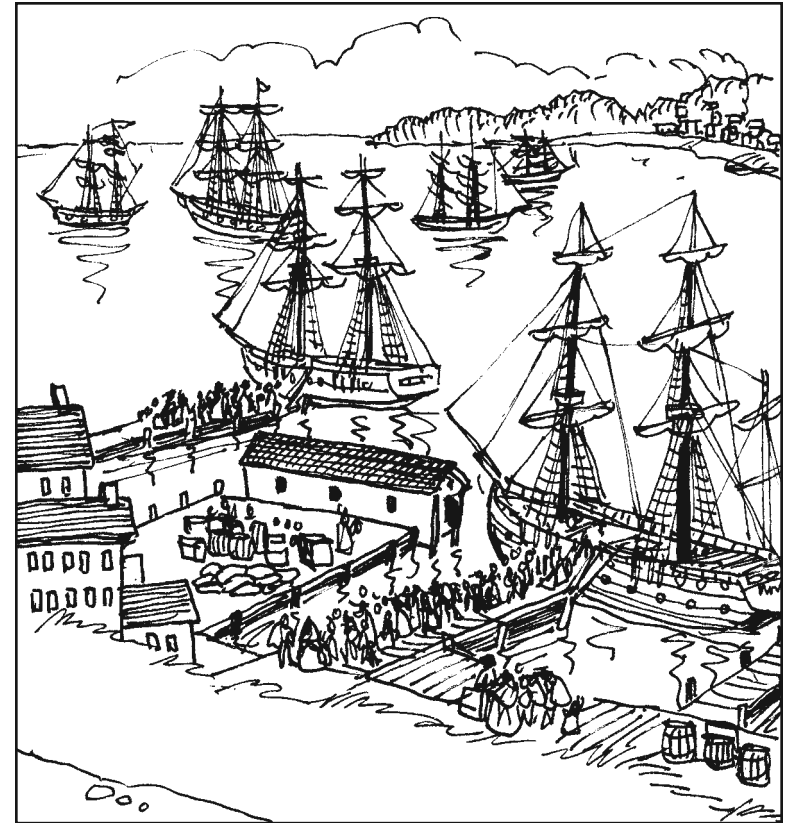


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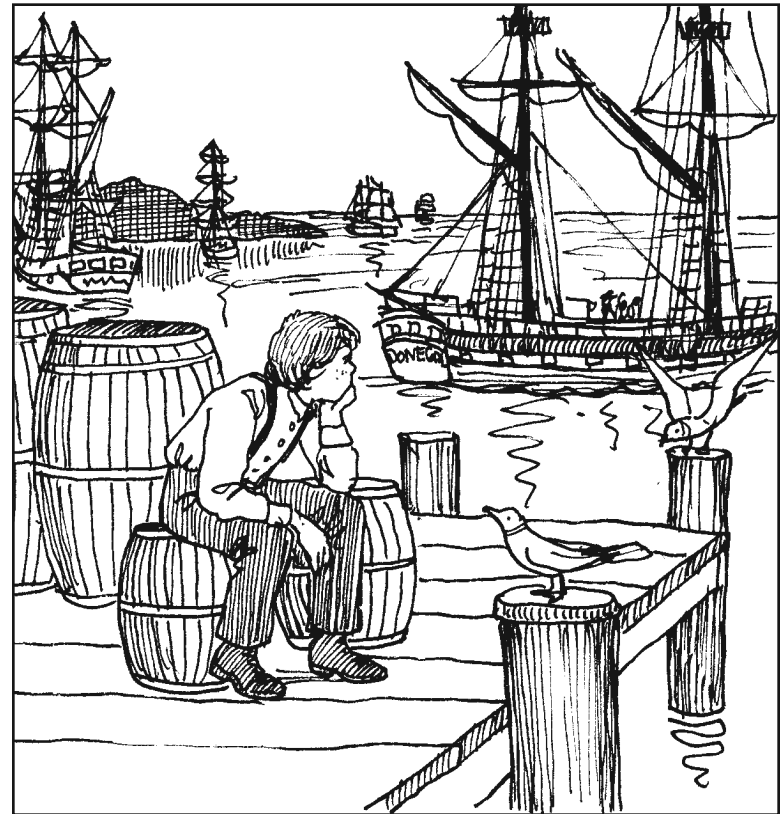
Leaving Dublin Bay

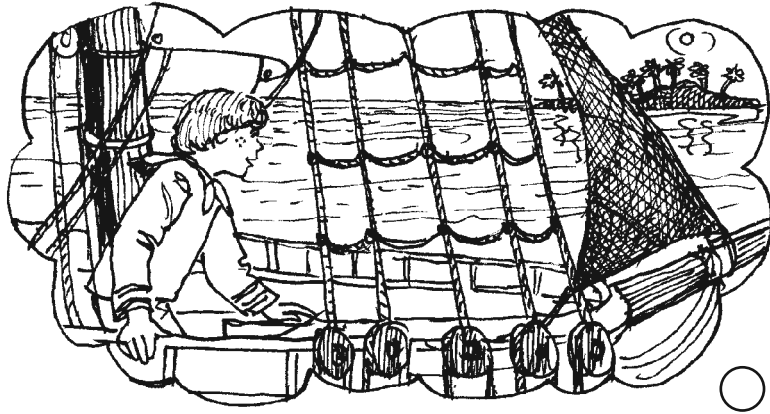
Patrick Kelley looked out over the ships floating in Dublin Bay. Below him, he saw hundreds of people crowding the docks, looking for space on one of the ships bound for America. The year was 1846, and many Irish people, most of whom were farmers, were starving. For the past two years, Ireland's potato crop had failed due to disease, resulting in a great **famine**.

To avoid starvation, Irish families like Patrick's bought passage on ships of all sizes sailing to the United States and Canada. The journey was dangerous, but the promise of a better life in America, where there was more land to farm and no diseases destroying the crops, drew many to the harbor. Patrick heard his father talk of jobs in big cities like New York and Boston. His father, who was a **blacksmith**, hoped to find a job working his craft in New York, which had thousands of horses to pull carriages and wagons through the streets. For that much work, Patrick's father was ready to leave Ireland.



Patrick knew his family was suffering, and he knew that America might offer a better life, yet Patrick did not want to leave Dublin. This was his home. He did not want to leave his friends, despite the food shortage, and he did not want to leave Dublin Bay, his favorite place. He often sat on the shore overlooking the bay during storms and felt the sea spray in his face, and he would listen to the stories of the suntanned sailors returning from journeys all around the world.





Patrick wanted to be a sailor in the warm South Pacific Ocean; he did not want to be a crowded passenger aboard an **immigrant** ship crossing the cold Atlantic.

So, Patrick sat on the docks by himself, angry with his family, mostly his father, for making him leave. He shaded his eyes from the setting sun on the horizon and looked for the tall **mast** of the *Donegal*, the ship that would take his family to America the following morning. He spotted the *Donegal* a little farther down the docks; it was easy to pick out because it was larger than most of the other ships. He could see the name painted in gold letters across the **stern** of the ship as it gently bobbed in the water. Patrick glared at the massive boat, wishing it would sink to the bottom of Dublin Bay. He shut his eyes, closing out the sight.

Promise of a Better Life

By the time Patrick finally decided to go home, it had grown dark. Patrick lived on the edge of Dublin, where his house was connected to his father's large blacksmith barn and shop. After he left the edge of the water, which reflected the oil lamps along the docks and the faint moonlight above, the streets and alleyways leading home were so dark that he could see just a short way ahead. The dim glow coming from the windows of houses did little to light his way.

After a few blocks, Patrick noticed footsteps behind him. The streets were usually deserted after dark, and Patrick wondered who might be out tonight. The footsteps drew closer and closer, and as he listened, Patrick detected a strange metallic clicking along with the footsteps. Frightened, Patrick kept his head down and began walking faster.

Another block later, the steps and the clicking got closer still. **Frantically**, Patrick tried to remember an alleyway or doorway he could duck into to get away from this stranger following him.

Suddenly, Patrick felt a small jab on the top of his shoulder. His blood froze in terror.



"Excuse me, young man!" he heard behind him. Patrick stood still, afraid to turn around.

"Young man, I say! Where are you off to? I noticed you eyeing the *Donegal* down at the docks."



Still frightened, Patrick slowly turned around. Standing over him glared an older man with a silver beard glowing in the lamplight and a military sword in his right hand.

"Who are you?" Patrick asked, trying to sound confident.

"I am First Mate Thomas O'Brien, an officer of the *Donegal*, at your service," he answered in a serious tone.

"The *Donegal*?" Patrick repeated. "My family and I are sailing on the *Donegal* tomorrow."

"Ah, very good," O'Brien answered. "She's a fine ship, and the sailing conditions are better than most other ships these days."

"But I hear the living conditions are bad on these ships," Patrick asked.

"Well, they often are," Thomas replied. "Some ships are worse than others. Unfortunately, conditions usually depend upon how much money a family can spend on their fare."

"Yeah, I know," Patrick interrupted. "My father spent most of our savings on this trip."

"Your family will travel on a ship with a record for bringing its passengers safely to America, even though the journey will still be difficult and uncomfortable," O'Brien said. "The Atlantic is a huge ocean, and the weather can be dangerous on the open sea."

Patrick thought about this for a moment. "I can't remember the last time I wasn't going to bed feeling hungry. I don't want to live like that much longer."

"Exactly," Thomas responded. "In an emergency, people must make difficult choices to make life better. But listen to me, young man. I've seen America many times, and I think that a better life is waiting for you and your family. You will have to work very hard, but if you do, there should be no limit to what you can accomplish."

"Yes, sir. That's what my dad keeps telling me. Maybe he's right," Patrick admitted.

"Of course he's right, son," Thomas answered. He then looked back toward the harbor. "Well, young man, it's getting late. You should be off to bed. After all, this may be the last peaceful night's sleep you'll have for several weeks," he said with a wink.

"Okay, sir. Thank you for the advice. Maybe I'll see you on the ship," Patrick said as he turned to go home.





Stormy Seas

A week later, Patrick and his family were well on their way to America aboard the *Donegal*.

"All hands on deck! All hands on deck!" Patrick heard from above. In the darkness below decks, Patrick heard his sister groaning. She had been sick for three days, like many of the people on the ship. After several days of calm seas sailing from Dublin, the *Donegal* had run into a violent storm.

On the first day of the storm, Patrick watched from the deck with excitement as giant walls of water would swell and approach the ship. Patrick's stomach would rise in his throat as the *Donegal* climbed, hovered for one awful second at the **crest** of the wave, then crashed down the far side of the wave in a great rush.

This was exciting, but the storm was getting stronger, and the constant rising and falling of the ship was churning the stomachs of the passengers, many of whom, like Patrick's sister, became seasick.

"All hands on deck! We must lower these sails, boys!" Patrick heard these commands again from above. He knew that "hands" only meant the sailors, not any of the passengers, but he felt he couldn't stand staying below in the darkness one more moment. He desperately wanted to see the sailors handling the stormy conditions. So, when no one was looking, Patrick burst up the main **hatch** and into the howling wind and freezing spray.

The deck of the ship was wildly confusing—sailors running around, officers barking orders, sails flapping in the wind, and white ocean spray crashing over the rails of the ship.



"Captain! One of the sails has wrapped itself around the upper **yardarm**!" Patrick heard a sailor yell out to the captain.

"Well, send someone up there to untangle it. We need that sail down before the wind tears it!" the captain thundered.

"We can't, sir," the sailor replied. "The yardarm has been damaged in the wind and can't support a sailor's weight. We would need someone much smaller."

The sailors hadn't noticed Patrick yet, but as he heard this, he only needed to think about what they said for a moment.

"Excuse me, sir!" he said as he tugged on the captain's coat. The captain turned quickly and, seeing Patrick, yelled, "You, boy! What are you doing above deck? Get yourself below with the other passengers."

"But, sir," Patrick protested. "I can climb the mast and untangle the sail."



"What? You? What makes you think you could do this? It's howling out here. These are no conditions for a passenger."

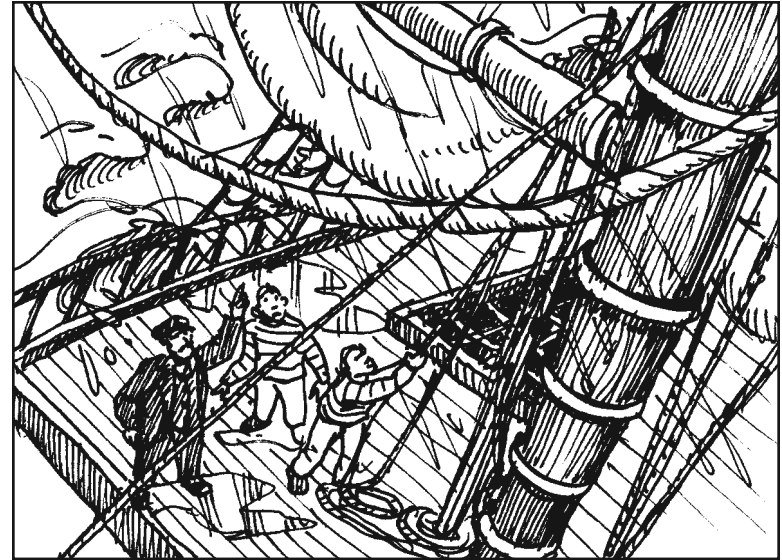
"It's really no problem, sir. I've grown up along the coast all my life. The wind doesn't bother me, and I have to climb in the **rafters** of my father's blacksmith barn every day to hang up his tools." Patrick said this with as much confidence as he could fake, but the wild wind and water frightened him. He didn't dare to actually look up at the mast.

Before the captain could answer, another sailor interrupted them.

"Sir, we must do something quickly, the sail is beginning to tear!"

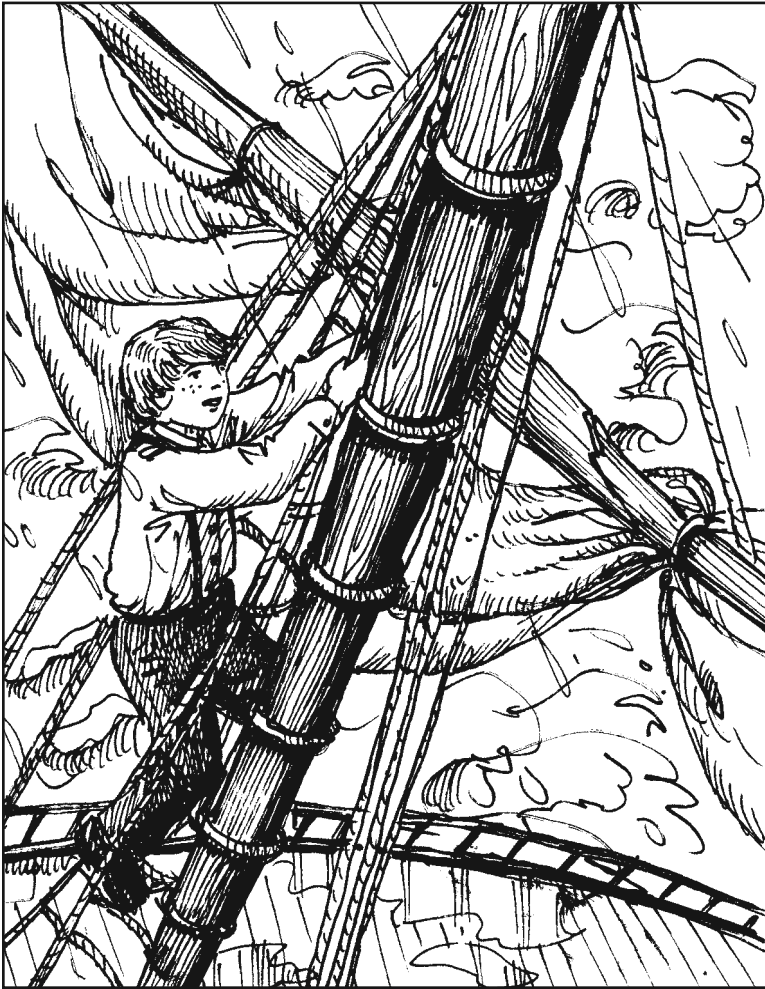
The captain looked out over the stormy sea, then leaned down and grabbed Patrick by the shoulders. "All right, lad. Be careful, climb slowly, and do NOT look down. Just concentrate on the mast ahead of you. You can do this! Now, up you go."

Climbing the mast wasn't scary for Patrick at first, as long as he just looked straight ahead. Halfway up, however, Patrick was unable to resist temptation and, holding tightly to the mast, he looked out and below him.



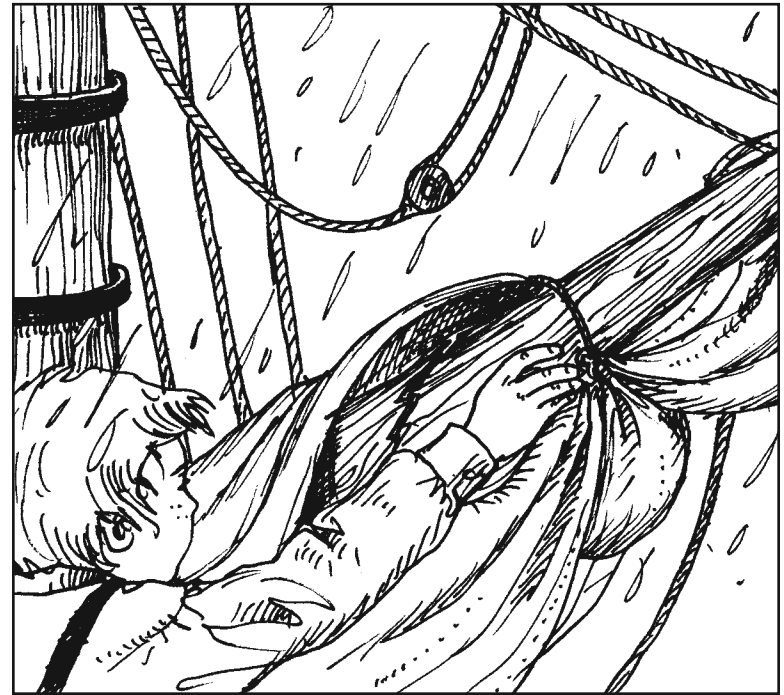
Through a crisscross of ropes whistling in the wind, he saw the white tops of the waves surrounding the ship and the small heads of the sailors scurrying around the deck of the ship. He briefly thought of his family out of sight below the deck, and how worried his mother would be right now if she saw him up here. This thought vanished quickly, however, as Patrick felt a wave of dizziness overtake him. The rocking of the ship on the waves was twice as strong up on the mast, and seeing all the waves around him made his head spin. Fighting against this dizziness, Patrick refocused on the mast in front of him. His head quickly cleared, and he climbed the rest of the way up the mast.

At the top, he could see the crack in the wood of the yardarm, but it didn't look very large, so he knew if he took care, he would be okay. Looking out, he could see the top of the sail flapping in the wind and the clip he needed to unhook to lower the sail.



"Okay," he said to himself. "Here goes."

Carefully reaching out from the mast, Patrick stretched his hand toward the clip. Glancing down for a moment, he could see the faces of the captain and crew looking up at him from below. Stretching a bit farther, feeling the mast sway dangerously under him, he caught hold of the clip. Tugging with all of the strength he could find in his awkward position, he felt the clip give way and the sail drop below him. A cheer rose from the sailors below, and the captain happily waved at him to come back down the mast.





Arriving in America

Three weeks later, Patrick stood on the deck of the *Donegal* with his family. Before them the buildings of New York City came into view. At last, they had made it to America! On the docks, Patrick could see the activity as other ships were unloading from their own ocean journeys. Patrick could feel the energy and **bustle** of this new, growing city, so different from the centuries-old calmness of Dublin.

“Why, Patrick, my boy!” he heard a familiar voice behind him. It was First Mate Thomas O’Brien, whom he had not seen for several days. Thomas came up to Patrick and put his hand on Patrick’s shoulder.



Looking at Patrick's father, Thomas said, "You know, Mr. Kelly, none of us would be here in New York right now if it weren't for your son here." He looked down at Patrick and gave his shoulder a friendly shake. "What he did up on that mast in the storm was quite courageous. Quite remarkable."

"Thank you, sir," Patrick said, a little bit embarrassed.

"Well, we are all very proud of Patrick," Mr. Kelly said, looking fondly at his son. "And we are also very thankful to you and the rest of the crew of the *Donegal*," he continued. "Thanks to you, my family now has a chance for a new life—a better life—here in America."

"I wish you all the luck in the world," Thomas answered. "And, Patrick, I hope to see you at the Harbor whenever the *Donegal* is in port. You have the **makings** of a fine sailor, and you're welcome on the deck of this ship any time."

Patrick smiled excitedly at this invitation and imagined his future, sailing the oceans of the world, but always returning to his family and to America, his new home.

Glossary

blacksmith (<i>n.</i>)	someone who works with iron, including making horseshoes (p. 5)
bustle (<i>n.</i>)	busy and noisy activity (p. 21)
crest (<i>n.</i>)	highest point, or top of, something (p. 14)
famine (<i>n.</i>)	major food shortage (p. 4)
frantically (<i>adv.</i>)	wildly acting with emotion (p. 8)
hatch (<i>n.</i>)	covering for the opening that leads from a ship's deck to the areas below (p. 14)
immigrant (<i>n.</i>)	person who has come to a new country to live (p. 7)
makings (<i>n.</i>)	the qualities needed to do something (p. 23)
mast (<i>n.</i>)	a tall pole made of wood that stands on the deck of a ship to support the sails (p. 7)
rafters (<i>n.</i>)	wooden boards that support a roof (p. 17)
stern (<i>n.</i>)	the rear end of a ship (p. 7)
yardarm (<i>n.</i>)	the outer tip of a horizontal beam supporting a square sail on a ship (p. 15)

Name _____

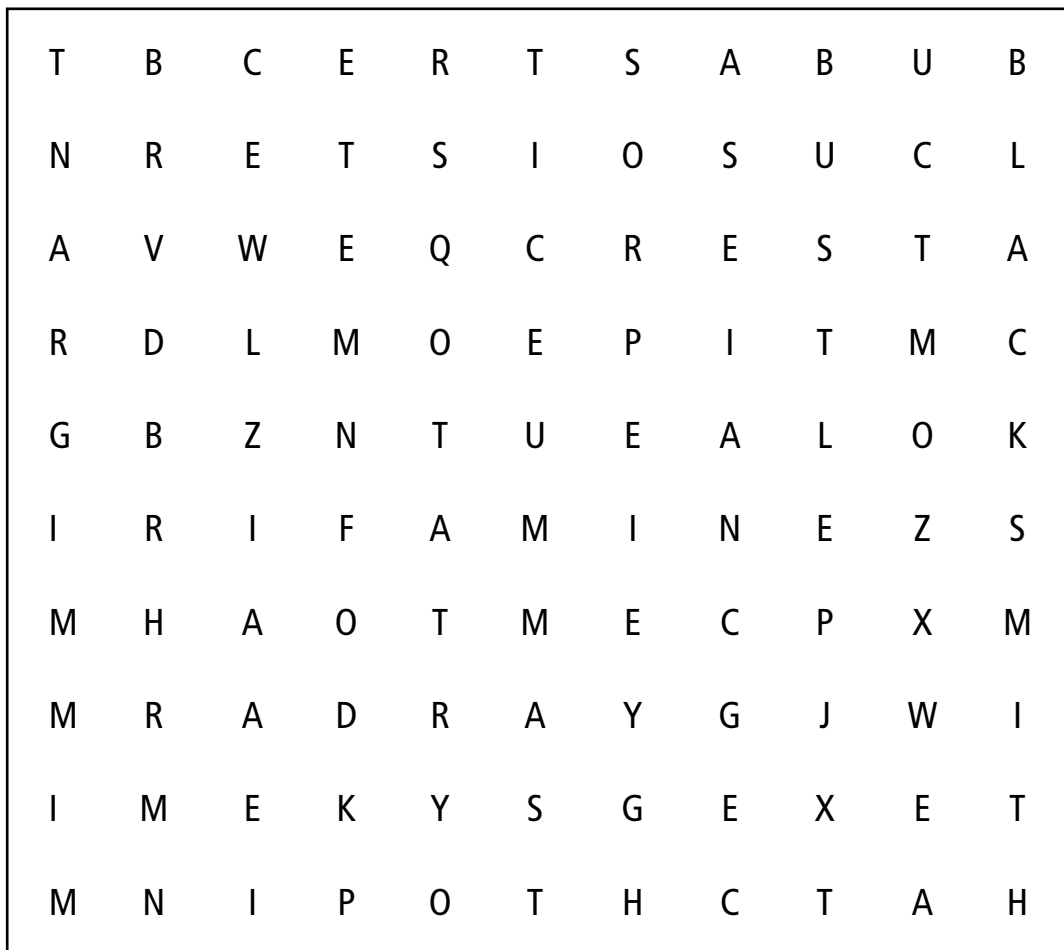
INSTRUCTIONS: Fill in the chart with the information you read in *Atlantic Crossing*.

Problem and Solution
Explain the major problem in the story.
What caused the problem?
What will happen if the problem isn't solved?
How is the problem solved?
In what way is Patrick changed once the problem is solved?

Name _____

INSTRUCTIONS: Use your book to complete the sentences. Then find the words in the word search.

1. The rear end of a ship is its _____.
2. Someone who works with iron is called a _____.
3. A _____ occurs when there is a major shortage of food.
4. A person who comes to live in a different country than his or her homeland is called an _____.
5. A town that is full of noise and activity is said to _____.
6. The wooden boards that support a roof are called _____.
7. The covering of an opening on a ship's deck is called a _____.
8. The highest point of a wave is called its _____.
9. The outer tip of a horizontal beam that supports a square sail is called a _____.
10. The _____ is the part of the ship that supports its sails.



Climbing Mountains: An Interview with Erik Weihenmayer

A Reading A-Z Level W Leveled Reader

Word Count: 2,346



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Climbing Mountains: An Interview with Erik Weihenmayer



Written by Kathie Lester

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Climbing Mountains:

An Interview with Erik Weihenmayer



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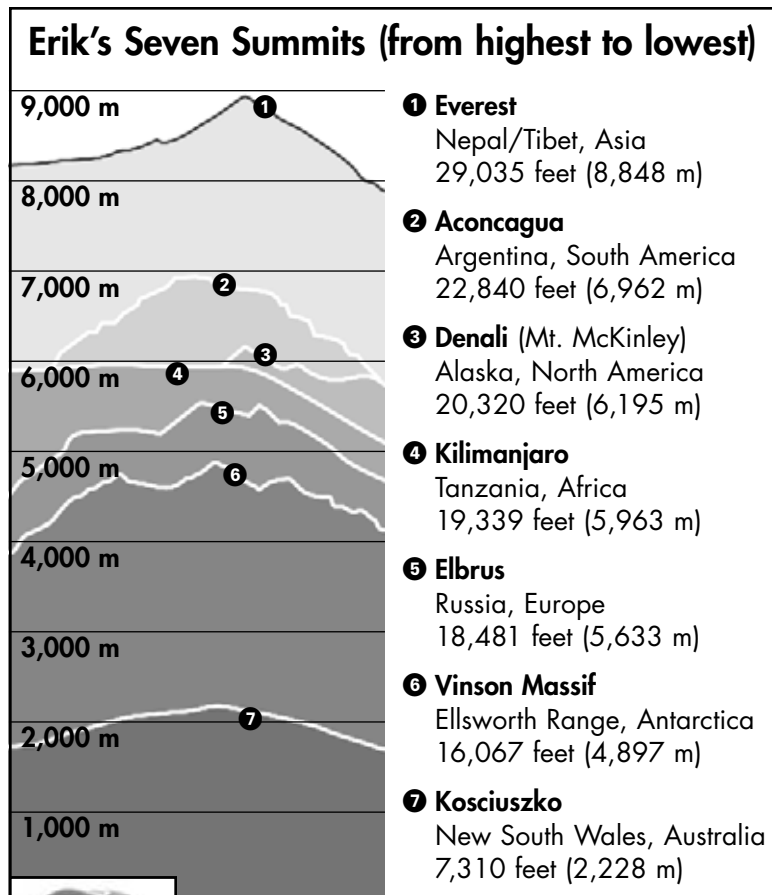
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Correlation

LEVEL W

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Reading Recovery	26
DRA	44



Erik Weihenmayer, 36 years old, has climbed the Seven Summits, the highest peaks on each of the seven continents. He

*was born with a **genetic** condition that caused him to lose his sight by age 13. Erik was interviewed the day before leaving for Tibet, where he was to lead six blind Tibetan teenagers up a 23,100-foot mountain. You can read about this climb at www.climbingblind.org.*

Interviewer: Can you see at all, or is everything black?

Erik: It's your eyes that go blind, not your brain, so I imagine an outline or shades of color. If I hear someone talking, I imagine a face and a body.

Interviewer: Is it like how I picture people when I talk to them on the phone?

Erik: Exactly. It's a fuzzy outline of things that my brain fills in so I understand the shape of the world.

Interviewer: How did you feel when you lost your sight?

Erik: Like a raccoon that's been cornered—I didn't know what to do or who to turn to. I just panicked. I didn't know what would happen to me as a result of being blind, just that everything seemed harder. I didn't want to be helpless or removed from everyone else in the world. I had a lot of fears, and a lot of anger bubbled beneath the surface; but I gradually realized I had to accept it. Things end in your life, and that's the way it is. You know, some things die, some things are reborn, and you have to renew yourself. Rock climbing was one of the ways I did that.



Erik Weißenmayer, early climbing years

Interviewer: How did you get started in climbing?

Erik: The Carroll Center for the Blind (in Newton, Massachusetts, USA) had an activities program for blind kids. Blind kids can't participate in team ball sports, so when, in addition to cross-country skiing and sailing, they took us rock climbing, I knew I'd found something I could do that was really exciting.

Interviewer: How did you learn to rock climb?

Erik: At first someone gave me detailed instructions like “reach right” and “put your foot farther left,” but now I climb much more independently by feeling the cracks and pockets in the rock.

Interviewer: What does mountain climbing mean to you?

Erik: The scenery is exciting—the sounds, how the rock feels under my hands, the sun in my face, the ways the ground changes under my feet, the variations in the texture of the ice and snow. It's exciting to challenge the environment with my team, using my skill and **endurance**, bringing uncontrollable situations under control.



Erik, right, and fellow climbers on Mt. Ama Dablam in Khumbu, near Mt. Everest



Erik wears pointed boots and uses a pole and an ice ax to climb over ice and packed snow.

Interviewer: Please describe how you know where you're going when mountain climbing.

Erik: There are different parts to mountain climbing. When I'm hiking, I follow somebody who has a bell tied to his pack. I use long trekking poles to feel the **terrain** in front of me. When I find a place I want to step, I lean on that pole and take a step, and then I scan with the other pole. It sounds slow, but it's not; I can hike as fast as anyone. When we go up nearly vertical snow in deep gullies called **couloirs**, I kick the toes of my boots into the snow and take one step at a time, and I swing an ice ax into the snow. I'm feeling my way up slowly just like everyone else.

When I climb vertical ice—frozen walls of ice that look like waterfalls—I kick into the ice with **crampons**, which are sharp points on the toes of my boots. I stand up high on the toes of my boots and swing my ice tools into the ice, and then I hang from the ice tools and pull myself up. I don't have to see where I'm swinging. Sighted climbers look for blue ice because white ice is rotten, but I can tell if it's rotten by tapping the ice with the tools and listening to the sound and the **vibration**.



Erik climbs an ice cliff.

Interviewer: Can you take the lead climbing on a mountain?

Erik: The job of the person in the lead is to bring the rope up attached to his harness, jam pieces of metal gear into the crack, and then clip the rope to the gear to help keep everyone safe. I can lead a climb on rocks by touch when we're climbing a vertical crack or pockets.

Interviewer: But you don't lead when you're crossing areas where there are crevasses?

Erik: On very narrow snow bridges that go over crevasses, I would need to be able to see in order to line up the best route. On a big mountain, I'm usually roped to two other people, and I follow someone.

Interviewer: How do you know if narrow snow bridges are sturdy enough?

Erik: You have to test them—that's why we're roped up. If the first person breaks through, the other two people on the team throw their bodies down and jam their ice axes into the ground. That brakes the person, and he dangles from the rope until he can slide up the rope and pull himself out.

Interviewer: What is the funniest thing that ever happened to you while climbing?

Erik: About a half hour before we summited Mt. McKinley, we radioed down to the village. When we reached the top, my dad, wife, and two brothers were flying above us in a small plane. We waved our ski poles, all wearing red suits, looking identical to each other. When I asked my friend, "Do you think they'll know I made it?" he said, "Yeah, you're the only one waving your ski pole in the wrong direction." He was having fun with me, showing that he loved me, not being mean.

Interviewer: What is the scariest thing that ever happened to you while climbing?

Erik: My idea of climbing is to keep it boring. I've fallen in crevasses when snow bridges have collapsed, and I just leapt to the other side. Once when I was on a lead climb, a piece of gear that anchors the rope to the rock popped out of the rock, causing me to fall about 25 feet and dangle at the end of my rope. One time, when I was climbing up a loose rock gully, the whole rock started sliding. I just jumped to the side, and it slid by me. Once I was hanging on some ice while an **avalanche** poured down over my head. I got pelted with ice, but I was wearing a helmet. I've never had what I'd call a near-death experience.



Above: On top of Everest
Inset: Everest base camp

Interviewer: Can you describe what it is like to be on top of Mount Everest?

Erik: When you get to the summit, it's done—it's over. What's exciting to me is the planning, building a team, and getting prepared the best I can. I like working out details like where to put my gloves and my food and water so I can get to them quickly. I enjoy learning skills, like tying knots, which help me waste little time or energy in the mountains. To me, all that preparation is really fun.

You stand on the summit for 20 minutes at the most. On top of a mountain, the sound changes, because there's sky above and around you, and the sound vibrations move forever. I touch the snow and can hear the wind howling. It's really cool to be at the highest point, but after the summit is the hard part. Edmund Hillary, the first man to climb Mount Everest, said it only counts if you get down. You're tired, and you don't want to trip and fall down the mountain. Ninety percent of climbing accidents happen on the way down.



Erik with team on
Elbrus summit

Try This!

Erik talks more about sound:

*I hear ceilings and walls and things like that. Sound vibrations bounce off objects and come back at us, like a bat's **sonar**. Everyone can do it. So you can hear how tall the ceilings are, and walls. You can test this by walking down a hallway with your eyes closed. You can tell when there's an open door because the sound changes.*



Jeff Evans, right, captains Erik's tandem bike during Primal Quest.

Interviewer: Do you do other extreme sports?

Erik: I tandem bike—on the back of course. I've done some adventure races, where you mountain bike, kayak, raft, rock climb, hike, and canoe. I did a five-day race across Greenland and then a 460-mile race through the Sierra Nevada in California on the hardest terrain you can imagine. In the Primal Quest, the toughest adventure race in the world, we were one of 42 teams to finish out of 80 teams that started.

Interviewer: Do you have a guide dog?



Erik with his first guide dog, Wizard, one of the three German shepherds Erik has had

Erik: Yes, I've had three German shepherds. My first dog, when I was 16, was Wizard; my second, Seigo—a big bear of a dog—is retired; and I've had my third dog, Willa, for about a year. We wanted a gentle dog this time because I have a four-year-old daughter. Willa is little and kind of timid, so sometimes

I have to encourage her along, saying "Come on, you can do it." Then she always makes a good decision because she's smart. If I come out of a movie theater and say, "Find the car," she'll bring me right to our car when there are 100 cars in the parking lot.



Erik with daughter, Emma, who later prompted him to get a guide dog good with toddlers



Erik writes notes about a climb using a Braille n' Speak 2000, a word processor that will read back what he has typed.

Interviewer: Tell me about your upcoming trip to Tibet.

Erik: A German lady named Sabriye Tenberken traveled to Tibet, where she found blind kids who were four years old and hadn't even learned to walk. She started a school for the blind that now teaches 39 kids who were **outcasts** six or seven years ago. People wouldn't bring them out of the house, and now they're walking with their canes through the city of Lhasa, learning **Braille** in three different languages.



Meet the six students on the team to climb Lhakpa Ri (from left to right): Tashi, Kyla, Sonam Bongso, Tendsin, Kienzen, Dachung.

Interviewer: People thought these kids were stupid just because they were blind?

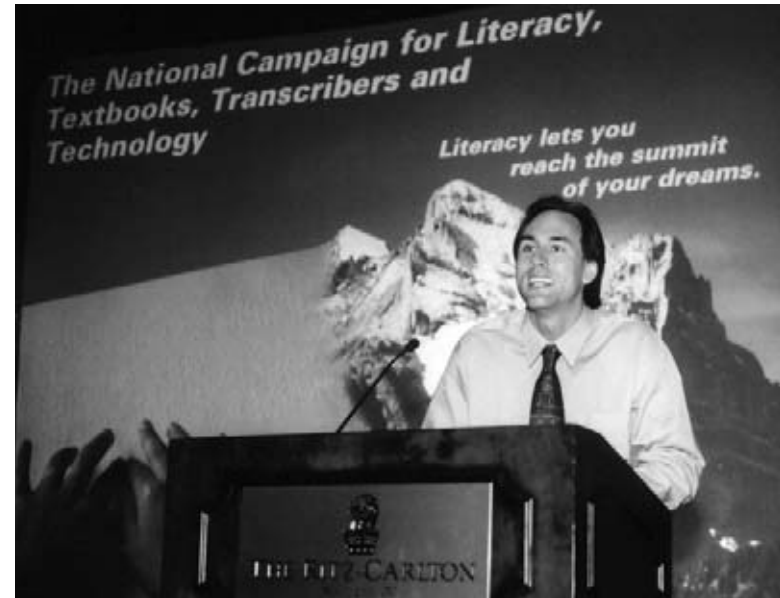
Erik: In some places, people think if you haven't been born perfect, maybe there's a reason, like maybe there are demons inside you. Sabriye is educating these kids, and now they're the smartest kids in their villages. They've gone from being outcasts to being respected. We thought it'd be cool to take six of her most fit, motivated kids up a peak. We picked a peak called Lhakpa Ri that's just north of Mount Everest. We trained them for three weeks in the spring for a month-long trip.

Interviewer: What was the training like?

Erik: We brought them out in the mountains, roped them to experienced climbers, and put crampons on their boots. One day we went over a big 17,500-foot mountain pass where there's no trail—just terrible terrain. It was storming—all the kids were shivering, one was throwing up, and one fell into a river. We wanted to test them, to push them, and they all passed, so we think they're ready. They're really tough. We think this project will create leaders out of these kids and give them a sense of their lives being full of possibilities. We also think it's a message to the world about what people are capable of.



Erik leads the Climbing Blind Tibet 2004 team.

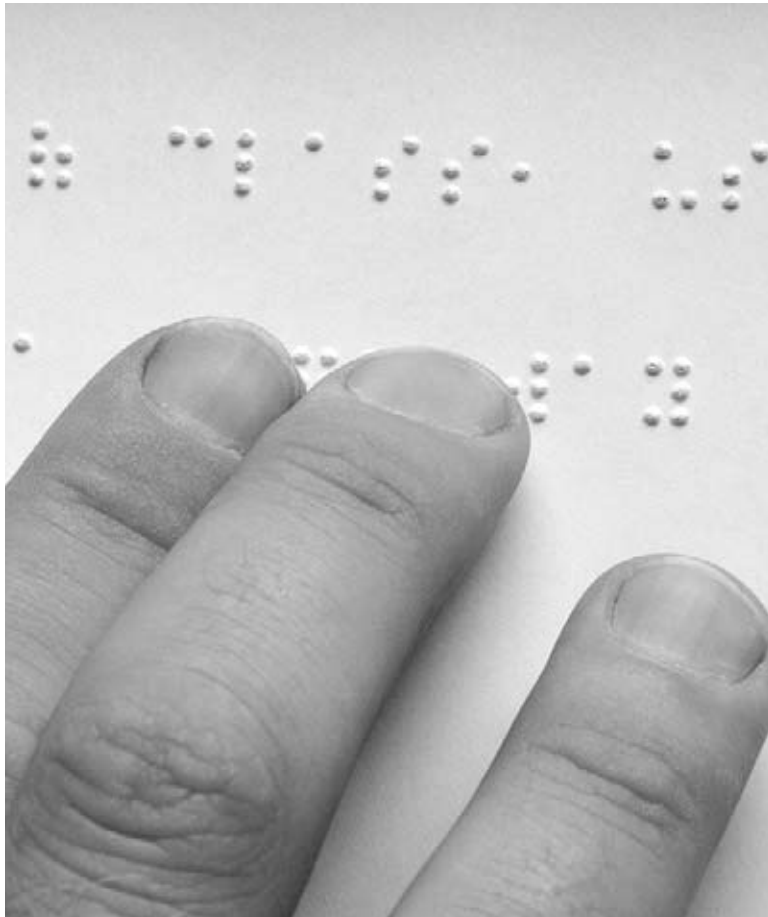


Erik speaks to a group about Braille literacy.

Interviewer: What work are you doing now besides mountain climbing?

Erik: I often speak to schools and show our Everest **documentary**. I read from my book, which is being used quite a bit in schools. The book is a lot about leadership, about losing something and then regaining something. It's about pushing into uncertainty, about climbing blind, which is not just about climbing a mountain as a blind person. It's about moving forward when you're not sure if you have what it takes, pushing through fear and doubt that can keep you from your goals.

I'm also a Verizon Literacy Champion for the American Foundation for the Blind. I speak to different educational groups about the need for blind kids to learn Braille, just like sighted kids need to learn print. This literacy program is publicizing the need for people to learn to translate books into Braille.



Braille uses patterns of raised dots that are read using your fingers.

Interviewer: What are your next goals?

Erik: I would like to climb hard for another four or five years. Climbing goals never end. I have a list a mile long—ice faces in Alaska, rock faces in Canada, rock and ice faces in the Alps, climbs in Chile and Peru and the Himalayas . . . the list goes on and on.



Erik treks up to Everest base camp. Having made it to Everest's summit doesn't mean he is finished climbing.



The Climbing Blind Tibet 2004 team celebrates.

Interviewer: What's your message for other people who are facing difficult challenges?

Erik: I don't climb to prove that blind people can climb mountains; I climb because I like it. But when a blind person stands on top of a mountain, it makes people reconsider what they think is possible. I think doors are opened because of that. People think less about what they can't do and more about what they might be able to do. We don't have to live our lives completely the way we, or others, expect them to be. Kids will pioneer new things in their lives that right now we can't even dream of. There are so many opportunities to nudge society forward. People write off their own ability to change the world, especially kids, but we all have extraordinary power in our own two hands.

Interviewer: Is there anything else you want to share with the people who will read this book?

Erik: I've learned from the mountains that you don't have to be the fastest, or the smartest, or the most popular, or the person with the best eyesight to be a leader. You need some skill, but you also need a vision of who you are and what kind of person you want to be. Then you need a lot of courage to carry it through. Many adults try to lead through their intentions and words, but I think you lead best by your actions. Climbers call it "taking the sharp end of the rope," which means actually getting out there and climbing. When I think about leadership, it's about taking the sharp end—it shows in your decisions rather than in your words.



Erik takes the sharp end of the rope by continuing to climb.



Erik reached the Seven Summits with teams that believed in him.

Interviewer: So in other words, people will follow you when you act rather than when you try to gather them up behind you by talking to them?

Erik: Yes. You need to gather a good team of people who believe in you, but what moves the world forward are people who are willing to step out and take the sharp end.

Explore More

To learn more about how Erik has pushed past the limits placed on him by blindness, read his book, "Touch the Top of the World: A Blind Man's Journey to Climb Farther Than the Eye Can See".

To learn more about Erik, visit his Web site at www.touchthetop.com

Glossary

avalanche	a large mass of snow and ice sliding down a mountain (p. 10)
Braille	a system of printing for the blind that uses raised dots for letters (p. 15)
couloirs	open, deep gorges or gullies usually containing snow or ice (p. 7)
crampons	metal spikes attached to the bottom of boots to allow firm walking on snow or ice (p. 8)
crevasses	cracks that can be small or very large in glaciers (p. 9)
documentary	film that dramatically shows factual events (p. 18)
endurance	the ability to make it through suffering and strain (p. 6)
genetic	having to do with heredity and variation of living things (p. 3)
outcasts	people who are rejected by society (p. 15)
sonar	ability to sense vibrations off objects using sound (p. 12)
terrain	the characteristics of a piece of land (p. 7)
vibration	a rhythmic movement of sound (p. 8)

Name _____

INSTRUCTIONS: Write the major events in Erik's life in order.

1.



2.



3.



4.



5.



6.



7.



8.



9.



10.

Name _____

INSTRUCTIONS: Use your book to find all of the past- and present-tense verbs that the author used. Write the past-tense verbs in the left-hand box below and the present-tense verbs in the right-hand box.

Past-tense verbs
caused, was, did

Present-tense verbs
see, imagine, hear

Name _____

INSTRUCTIONS: Write a word from the glossary in the word box. Below it, write the definition of the word.
Write a synonym and antonym on either side of the word, then use the word in a sentence of your own.

Synonym	Word Box	Antonym

Definition

Sentence

Synonym	Word Box	Antonym

Definition

Sentence

Adventure in Bear Valley

A Reading A-Z Level W Leveled Reader

Word Count: 2,039



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Adventure in Bear Valley



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Illustrated by David Cockcroft

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Adventure in Bear Valley



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Reading Recovery	26
DRA	44



"Going to California sure sounded like a grand idea when Ma and Pa were alive," Emily said in a low voice, the hush of the dark woods sending shivers down her spine.

Emily's brother Jess glanced warily at her as he picked up branches of firewood. "When Ma and Pa died, we didn't have any choice but to continue heading west."

Like many pioneers, their parents had died on the **perilous** trail to California, and the Hutchinsons, a young pioneering couple, had taken them in. The four of them had traveled for days through the grandest, greenest mountains they had ever seen. They finally set up camp somewhere on the western slopes in California just as the sun's rays faded from the horizon of the late September sky.

"The Hutchinsons seem plenty nice enough," Emily said, reflecting on friendly Mrs. Hutchinson, a **timid** woman who spent most of her time in the wagon.

"We're not their family," Jess said shortly. "Don't **tie to** them just yet."

Their wagon train had left the plains of Missouri in April on the promise of hitting pay dirt in Sierra Nevada gold country by October. A couple weeks ago their wagon and a few others had split from the main group on a route that would lead them to **kin** who had already settled in California.

Being **between hay and grass**, Jess had signed on to be Mr. Hutchinson's **apprentice** after Ma and Pa passed. Mr. Hutchison, a rather **bully** blacksmith, planned to sell tools he made to miners. And where Jess went, Emily dutifully followed, helping Mrs. Hutchinson cook and do chores.

As they gathered more firewood, Emily heard twigs snap. A low growl came from a clump of trees to the left.



"Did you hear that?" Emily whispered urgently to Jess. "Let's head back. I don't like it out here," pleaded Emily as the shadows grew long and the forest turned dark as midnight.

"Afraid of some ol' boogeyman?" Jess teased gently. "Well, I think we've got plenty of firewood anyway. Let's get outta here."

Walking back to camp, Emily couldn't help glancing over her shoulder every few steps.

"Just in time," Mr. Hutchinson said with a smile as they returned to camp. "I think the fire was about to **peter out**."

Jess scowled. It was just a harmless remark, but lately Jess was like a bear with a sore head around Mr. Hutchinson.

"Emily," Mrs. Hutchinson's voice interrupted her thoughts, "would you help me bake some biscuits?"





"I'd be glad to," Emily said. She walked over to the covered wagon—it stored everything they owned beneath its rounded canvas cover. Emily fetched the heavy iron skillet Mrs. Hutchinson used to make their meals.

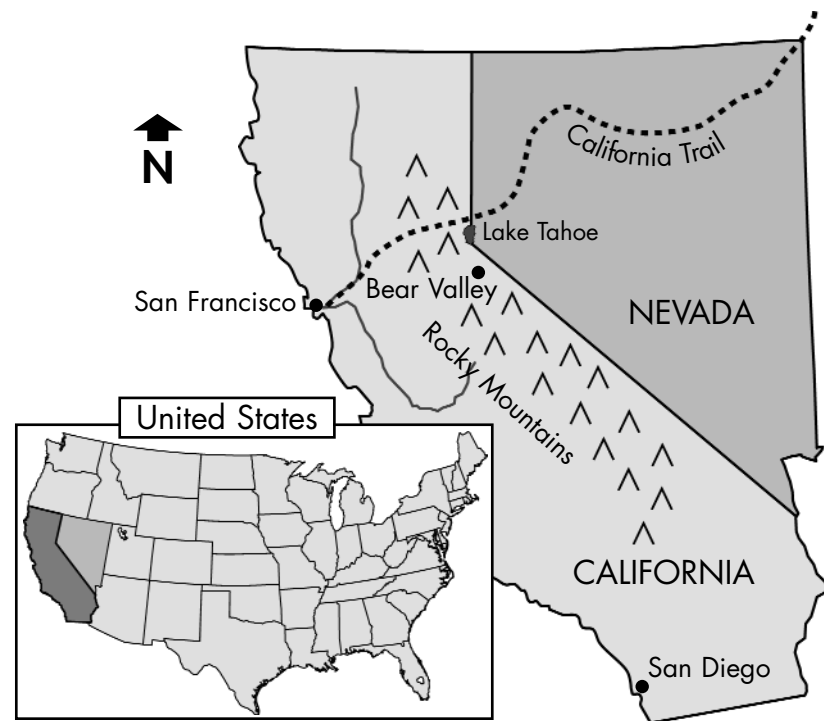
"Campfire biscuits again?" Jess said, "I'd give anything for a heapin' plate of Ma's biscuits."

Emily knew what he meant was that he'd give anything to have Ma back again.

Emily looked at Mr. and Mrs. Hutchinson. They'd both winced when Jess mentioned the biscuits. She hoped they didn't think Jess was criticizing Mrs. Hutchinson's cooking.

"Emily, when we get to Bear Valley," Mrs. Hutchinson said, "could you show me how to make your Ma's recipe for biscuits? I'm sure mine don't **hold a candle** to hers."

Before Emily could answer, Mr. Hutchinson said, "I have good news for you, dear. We just entered Bear Valley. We should be at your brother's **homestead** in a couple of days."





"Why do they call it Bear Valley?" Emily asked.

Mrs. Hutchinson gave her husband a look that said don't answer that, but he ignored it. "The children need to know the dangers in this wilderness, Elizabeth," he said to his wife.

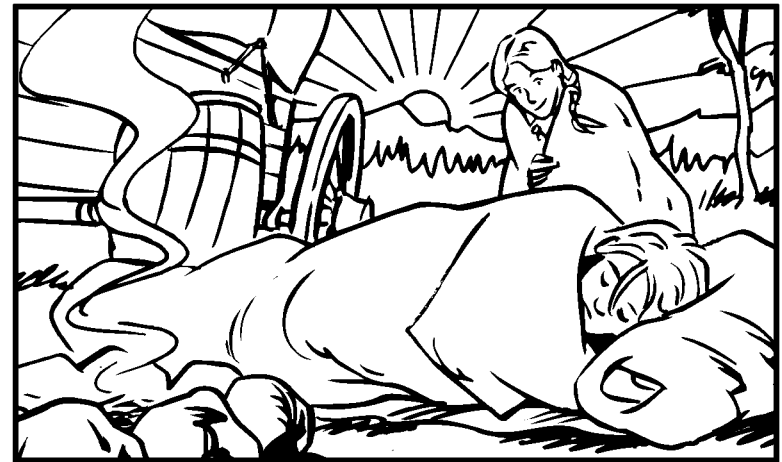
He explained, "There are bears in these woods, big black bears, bigger grizzly bears, and even mountain lions. You need to be careful, and don't wander into the woods alone."

That night, Emily fell asleep quickly, **dragged out** by traveling and chores. She tossed and turned throughout the night as she dreamed of strange forest creatures.

The next morning, Emily awoke early to find a light frost had blanketed the ground. "I'll make **flapjacks**," she said to herself, wanting to surprise Jess and the Hutchinsons.

Emily rebraided her hair as the sun peeked over the mountains, burning off the frost. Emily was dying to change into a clean, pressed dress like her mother laid out for her on Sundays, but she'd have to wait until they reached the homestead.

The campfire sputtered, the flames all but dead. Emily leaned over intending to shake her brother awake to collect wood. But Jess looked so peaceful she couldn't bring herself to wake him. She wrapped up in a blanket and headed into the woods.



The morning was strangely silent, and a brisk westerly wind blew through the giant spruce trees. The sun had yet to penetrate the canopy of the evergreens. Emily shivered. She gathered wood, moving quickly. With her arms loaded with damp, dead wood, she turned back to camp. Again, she heard a low growl and her spine stiffened. The sound came closer.

Emily was too terrified to move. Her stomach tightened. She'd never see Jess again.



Just then Jess leaped from behind a giant spruce tree wearing a big grin.

Emily started: "I should feed you bark and dirt for that **bosh**, Jess Edward!"

Jess tried unsuccessfully to stifle his laughter.

"I was going to make you Ma's recipe for flapjacks," Emily taunted. "Now I've got second thoughts."

Jess smiled, unapologetic. "Hold your horses, I was just joking. You know I love Ma's flapjacks."

Jess took some of the wood from Emily as she pinched his arm. Teasing like this made Jess's troubled face look almost happy.

When they returned, Mr. Hutchinson smiled and Emily smiled back. Jess flinched. Mr. Hutchinson was feeding the oxen. It was Jess's job to feed the animals in the morning and he thought Mr. Hutchinson might have a **blowup**. But Mr. Hutchinson held his tongue if he was angry.

"I'm making flapjacks," Emily explained.

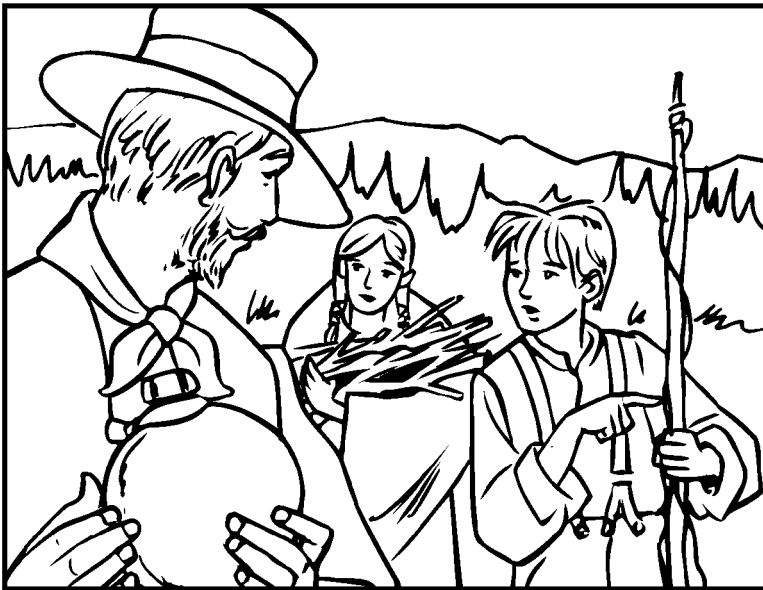
Mr. Hutchinson grinned. "Elizabeth loves flapjacks," he said. "And so do I."

While Emily mixed batter for the flapjacks, Mr. Hutchinson went to wake his wife, but returned wearing a long frown, worry lines creasing his deeply tanned face.

"Elizabeth's got a fever. We'll have to stay here until she's feeling better," he said. "That means we should find more food and water. Our **provisions** won't last too much longer."

"I saw a stream back there," Jess offered. "We can refill our water **canteens** and maybe catch a few fish."

"I don't like to leave Elizabeth when she's feeling so poorly," Mr. Hutchinson said.



"I'll stay here and care for her," Emily volunteered, hoping to give Jess and Mr. Hutchinson much-needed time together.

Mr. Hutchinson reluctantly agreed and gathered the canteens while Jess got the fishing gear.

Emily checked on Mrs. Hutchinson, who was awake and lying under a pile of blankets on a wooden **pallet** in the wagon.

"How are you feeling, Mrs. Hutchinson?" Emily inquired.

Mrs. Hutchinson gave her a weak smile. "Please, call me Elizabeth," she said. "You and Jess are family now."



Emily cautiously smiled back at her, uncertain of what to say.

“Would you like a cup of tea? Or maybe some flapjacks?” Emily said. “I covered them with a towel and kept them by the fire. They should still be warm.”

Elizabeth nodded gratefully.

Emily hurried down from the wagon to make tea and get the flapjacks. As she approached the fire, she stopped dead in her tracks. There in the campsite stood a rather small bear gulping down Elizabeth’s flapjacks. Emily’s mind raced, but she was frozen to the spot. She stared at the bear for a few **agonizingly** slow seconds, trying to remember everything her Pa had taught her about wild animals.

Emily realized the animal must have been attracted to the camp by the smell of food. She tried to remember everything she’d ever been told about bears, but her mind went blank.

The young grizzly hadn’t noticed her yet, but Emily knew a cub in camp meant the mother was most likely lurking nearby. She needed to get the cub out of there and fast—but how?





Emily backed away slowly. She needed to get back to the wagon before Elizabeth came out to see what was taking so long. Everything inside her wanted to run, but somehow she knew that was the worst thing to do. The bear would probably think of her as fresh food if she ran. She slowly backed away. She froze when the bear cub suddenly lifted its head and sniffed the air, exposing its sharp, sharp teeth.

Emily didn't move and the cub went back to foraging for food. Emily had an idea, but she had to get back to the wagon. She forced herself to gingerly walk the last few steps to the wagon and climbed in, breathing hard.

"Emily, what's wrong?" Elizabeth said, "Your face is as white as a sheet."

"There's a bear cub outside," Emily said, "And its mom is probably close by."

"What should we do?" Elizabeth said.

"I have an idea," Emily said, as she peeked out of the wagon. What she saw outside made her sick with fear. A second bear had joined the cub, and this one was huge, with frighteningly large claws and teeth.



"Oh, no," she breathed, but Elizabeth heard her.

"What is it?" she asked anxiously.

"The mama bear is here," Emily said, "Now I don't know if my idea will work."

She knew Mr. Hutchinson and Jess wouldn't be back at camp for hours, and they had the rifle. Emily had promised Mr. Hutchinson that she would take care of Elizabeth.

Elizabeth got up from her pallet, pale and shaky, but determined. "I'll help. Tell me what you want me to do."

Emily said, "We'll need the pots and pans. Help me take them down."

They lifted the pots and pans down from where they hung on hooks along the wagon's frame.

"I'm scared," Emily admitted.

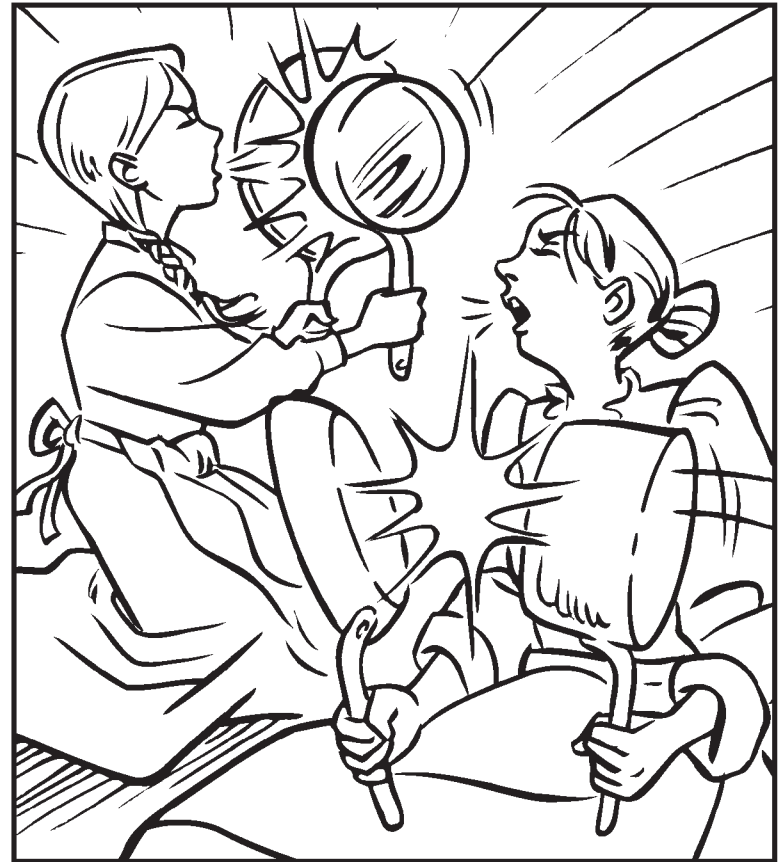
Elizabeth said: "Me, too. But we can do this together."

They smiled warily at each other. When Elizabeth reached over and gave her a quick hug, Emily felt a warm glow.

"Now what?" Elizabeth said.

"Now we bang the pots and pans as loudly as we can," Emily said. "My Pa told me once that bears don't like loud noises. On the count of three; one, two, three!"

They beat the pots and pans loudly and yelled until they were **hoarse**. Finally, they stopped, exhausted.



Emily and Elizabeth peeked out of the wagon to the quiet campsite.

"I don't see anything, do you?" Elizabeth asked.

Emily answered, "No, I think they're gone."

The two of them remained in the wagon for a long time after that just to be sure, but there was no sign of the bears.

Finally, Emily said. "Would you like a cup of tea now?"

"Yes, please, but I think I'll skip the flapjacks." Elizabeth said.

They looked at each other and collapsed into gales of laughter, relieved that the danger had passed. They left the protection of the wagon, confident that they had chased the bears away.

"Wait!" Emily said. She ran to the wagon and came back carrying pots and pans.

"Just in case," she said, handing two pans to Elizabeth.

Suddenly, they heard a twig snap and a sound coming toward them.

They screamed as loudly as they could and banged on their pots and pans.



When Mr. Hutchinson and Jess walked into view, they were carrying fishing poles and a line of trout. They also had **perplexed** looks on their faces.

"Elizabeth, what in the world are you doing up?" Mr. Hutchinson asked. "What's going on?"

Jess asked, "Emily, are you all right?"

"We thought you were the bears," Emily explained.

"Oh that's rich, Em!" Jess said not believing bears had come and he had missed it.

"No, it's true, we had a bit of a fuss with a mother and her cub," Mrs. Hutchinson replied.

"What mother and cub?" Mr. Hutchinson worriedly asked.

Elizabeth and Emily shared the rest of their dreadfully exciting adventure as Jess and Mr. Hutchinson admired their bravery.



Glossary

agonizingly	drawn out, painfully (p. 15)
apprentice	person learning a trade from a skilled worker (p. 4)
between hay and grass	slang for not a boy, but not quite a man, half grown (p. 4)
blowup	slang for fit of anger (p. 12)
bosh	slang for nonsense (p. 12)
bully	exceptionally good, outstanding (p. 4)
canteens	small containers to carry liquids (p. 13)
dragged out	slang for worn out or tired (p. 9)
flapjacks	slang for pancakes (p. 10)
hoarse	having a rough voice (p. 20)
hold a candle	inferior compared to another (p. 8)
homestead	house and the land around it (p. 8)
kin	a person's relatives (p. 4)
pallet	a temporary bed typically made of straw, placed on the floor (p. 14)
perilous	dangerous (p. 3)
peter out	to die out (p. 6)
perplexed	confused (p. 22)
provisions	supplies (p. 13)
tie to	slang for relying on (p. 4)
timid	lacking courage or self-confidence (p. 4)

Name _____

INSTRUCTIONS: Before reading the book, fill in the first column with your predictions about what will happen in *Adventure in Bear Valley*. During reading, pause to fill out the middle column with changes in your predictions. When finished reading, write what actually happened in the final column.

What I predict will happen	Changes in my prediction	What actually happened

Name _____

INSTRUCTIONS: Write the major events of *Adventure in Bear Valley* in the correct order, using the boxes below.

1.



2.



3.



4.



5.



6.



7.



8.



9.



10.

Name _____

INSTRUCTIONS: In each of the word boxes below, write a slang word or phrase from *Adventure in Bear Valley*.
Below each word, write its definition. Then use the slang word or phrase in a sentence of your own.

Word Box	

Definition	

Sentence	

Word Box	

Definition	

Sentence	

Hurricanes

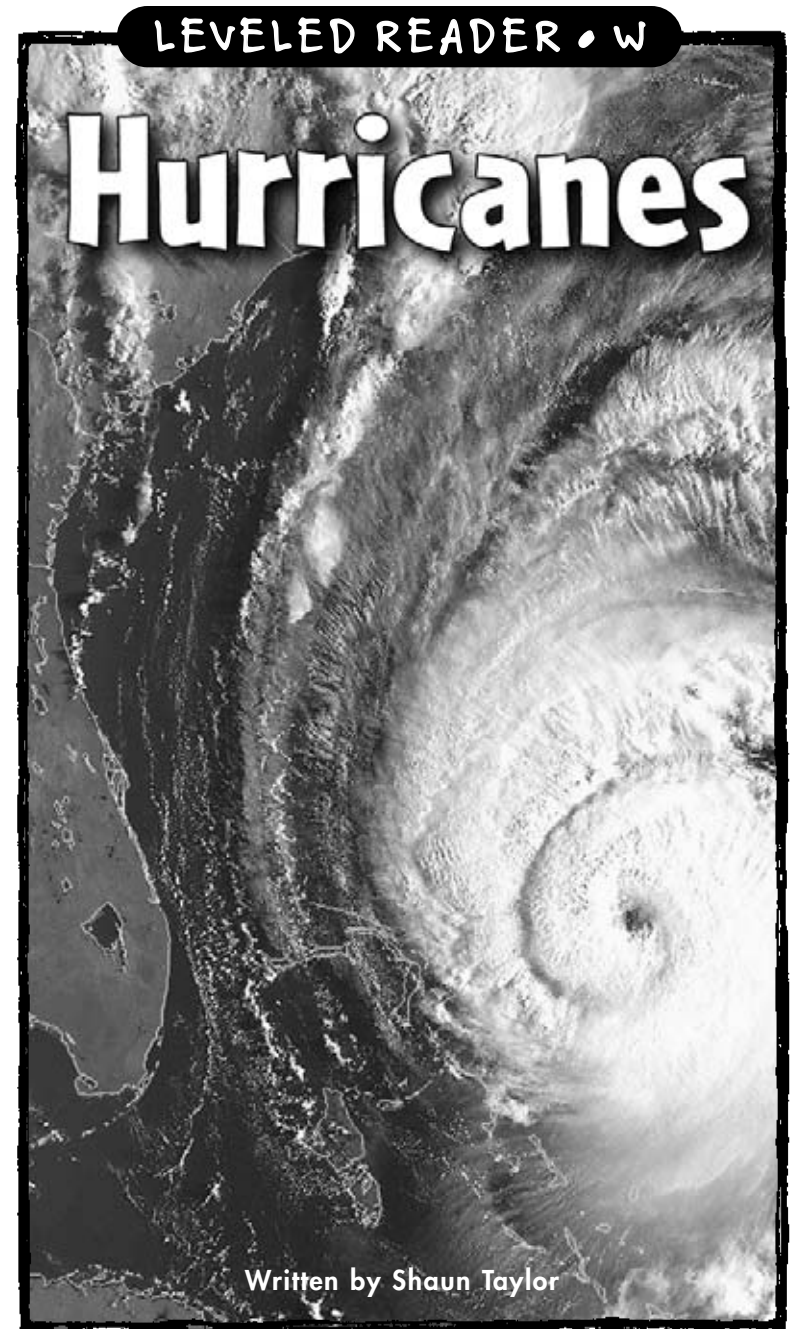
A Reading A-Z Level W Leveled Reader

Word Count: 1,715



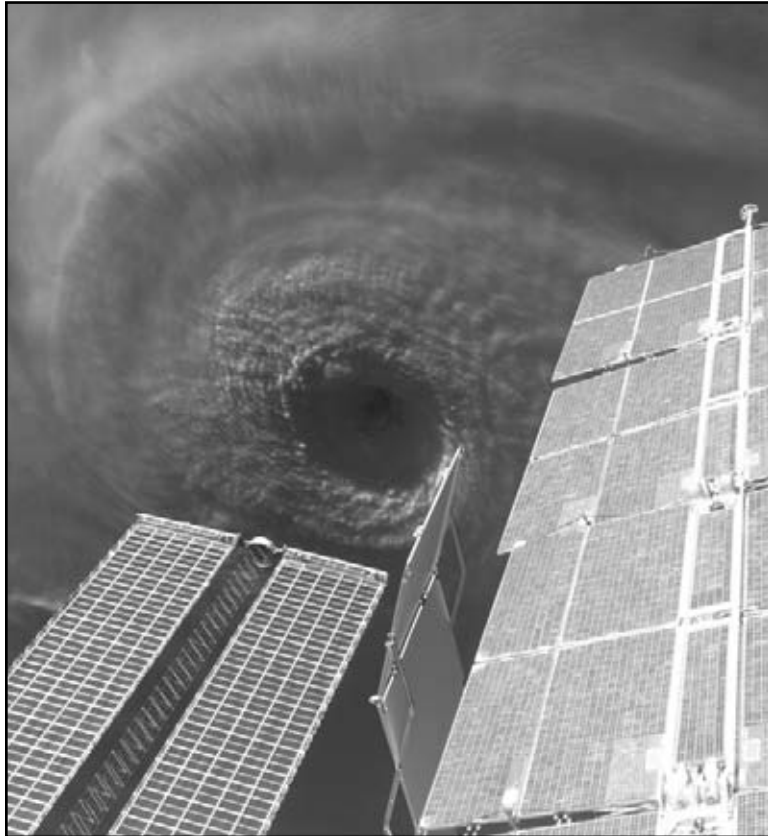
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Hurricanes



Written by Shaun Taylor

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Editor's note: Cyclones that form in the tropics are called different names in different parts of the world. In the Atlantic Ocean they are called hurricanes, in the Pacific Ocean, typhoons, and in the Indian Ocean, severe tropical cyclones. This book will use the word hurricane to describe them all.

Hurricane names

2002	2003	2004	2005	2006	2007
Arthur	Ana	Alex	Arlene	Alberto	Andrea
Bertha	Bill	Bonnie	Bret	Beryl	Barry
Cristobal	Claudette	Charley	Cindy	Chris	Chantal
Dolly	Danny	Danielle	Dennis	Debbie	Dean
Edouard	Erika	Earl	Emily	Ernesto	Erin
Fay	Fabian	Frances	Franklin	Florence	Felix
Gustav	Grace	Gaston	Gert	Gordon	Gabrielle
Hanna	Henri	Hermine	Harvey	Helene	Humberto
Isidore	Isabel	Ivan	Irene	Isaac	Ingrid
Josephine	Juan	Jeanne	Jose	Joyce	Jerry
Kyle	Kate	Karl	Katrina	Kirk	Karen
Lili	Larry	Lisa	Lee	Leslie	Lorenzo
Marco	Mindy	Matthew	Maria	Michael	Melissa
Nana	Nicholas	Nicole	Nate	Nadine	Noel
Omar	Odette	Otto	Ophelia	Oscar	Olga
Paloma	Peter	Paula	Philippe	Patty	Pablo
Rene	Rose	Richard	Rita	Rafael	Rebekah
Sally	Sam	Shary	Stan	Sandy	Sebastien
Teddy	Teresa	Tomas	Tammy	Tony	Tanya
Vicky	Victor	Virginie	Vince	Valerie	Van
Wilfred	Wanda	Walter	Wilma	William	Wendy

Hurricanes

Level W Leveled Reader

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Illustrations by Cende Hill

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LEVEL W

Fountas & Pinnell	S
Reading Recovery	26
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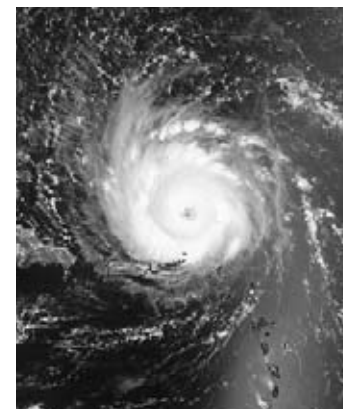
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A Hurricane Is Coming!

"This just in from the National Hurricane Center in Miami. A **hurricane watch** is in effect for the Florida east coast from Florida City north to Flagler Beach, including Lake Okeechobee. Hurricane Frances is about 555 miles east-southeast of Palm Beach and is moving toward the west-northwest at about 14 miles per hour."

The message crackles over a radio at a small Florida cafe. The patrons look outside at a warm, sunny day and then out to sea for any signs of the approaching storm—there are none. However, the television shows a **satellite** image of a gigantic, spiraling storm. A dotted line shows the hurricane's path and a shaded wedge shows where the hurricane might hit the coast.

The people in the cafe have already been hit with one hurricane this season, and they know they must prepare. Some buy more plywood to board up windows. Others get supplies at the grocery store, such as water, food, and batteries.



Hurricane Frances just north of the island of Puerto Rico

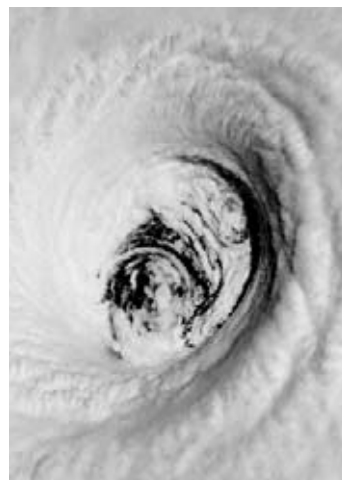


High waves from the September 1945 hurricane flood Miami.

The next morning, the wind speed picks up, and the sky clouds over. Some people farther down the coast **evacuate**, or leave their homes to go to safer areas. Winds reach hurricane strength, bending over palm trees as if they are made of rubber. The wind rips roofs off buildings, and flying objects become deadly. High waves and rising water flood low-lying areas on the coast. Falling trees break power lines. Some residents who were not evacuated sit in the darkness of their homes listening to the storm's progress on their battery-powered radios. Finally, the storm moves inland, and the wind slows down; but drenching rains and flooding remain. The next day the sun comes out, and people begin the costly cleanup.

What Is a Hurricane?

We have all experienced wind and rainstorms, but what makes a hurricane different? Hurricanes are gigantic, circular storms that can be hundreds of miles wide. When they occur in the Pacific Ocean, they are called typhoons. In the Indian Ocean, they are called severe tropical cyclones. In the Atlantic Ocean, they are called hurricanes. No matter what they are called, winds over hundreds of miles per hour, inches of rain, and high seas cause death, and sometimes billions of dollars in damage.

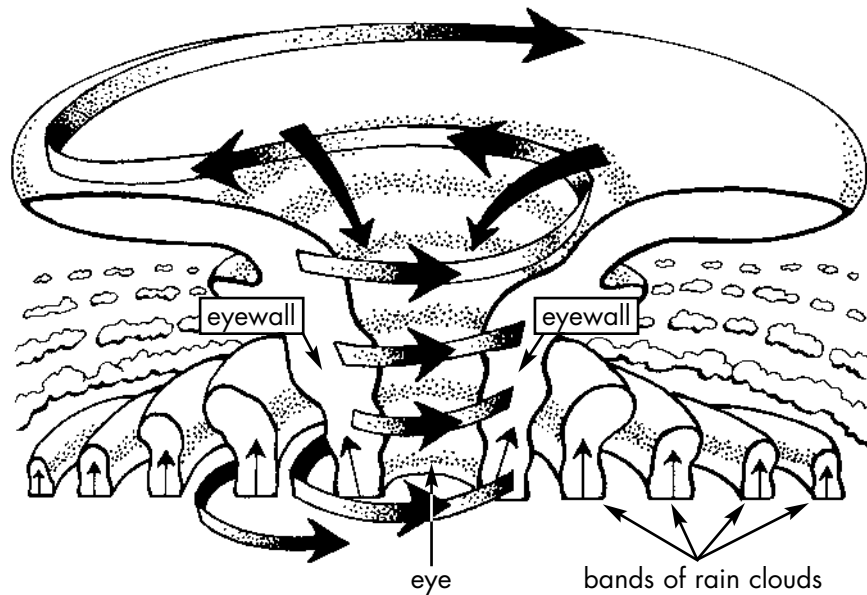


Eye of a hurricane

Do You Know?

According to the National Hurricane Center, the word "hurricane" comes from the name *Hurican*, the **Caribbean** god of evil. Islands in the Caribbean Sea are often in the path of hurricanes.

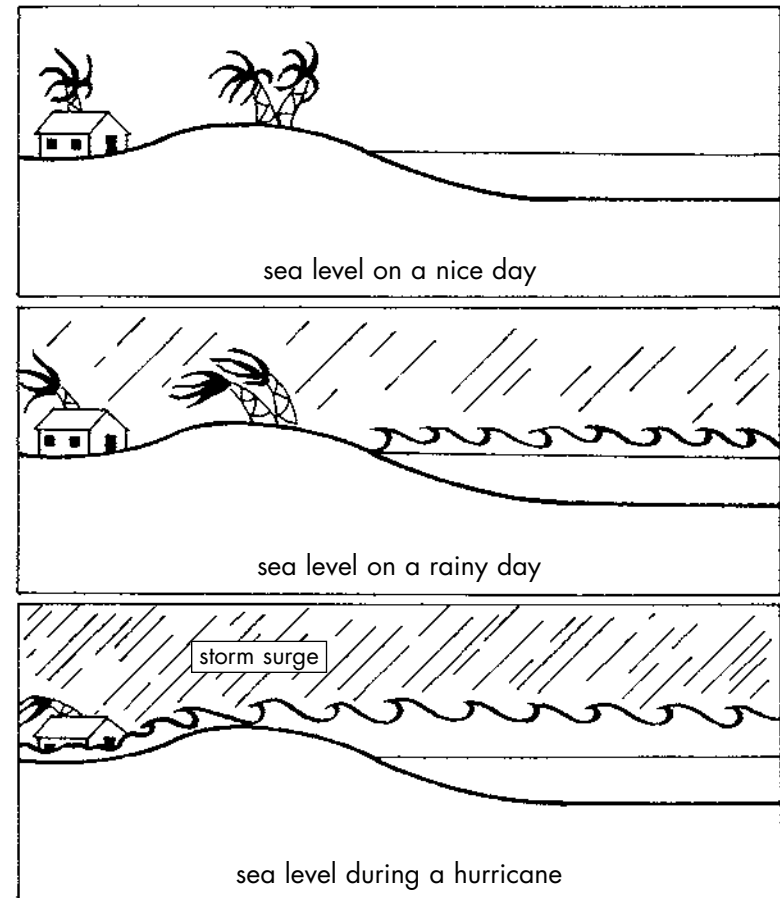
Hurricanes have a distinct **structure** that can be seen on satellite photos. Clouds extend out as spiraling arms for hundreds of miles around the center. The center of a hurricane is called the **eye**. Winds become more and more intense from the edge of the storm to the **eyewall**.



Fully formed hurricane

The eyewall is where winds rushing toward the center suddenly turn upward. The upward-moving air rapidly cools, and rain begins to fall. Most of the rainfall occurs in the eyewall. Sometimes rainfall reaches 20 millimeters (0.78 in.) of rain per hour, which can dump about 15–30 centimeters (6–12 in.) on one area over several days.

Yet, inside the eye, it's often calm and sunny. Most hurricane eyes are 30–60 kilometers (20–40 mi.) in diameter. In the eye of a hurricane, the peacefulness will not last long. Soon the eye will move, and then the sudden force of the other side of the storm will hit.



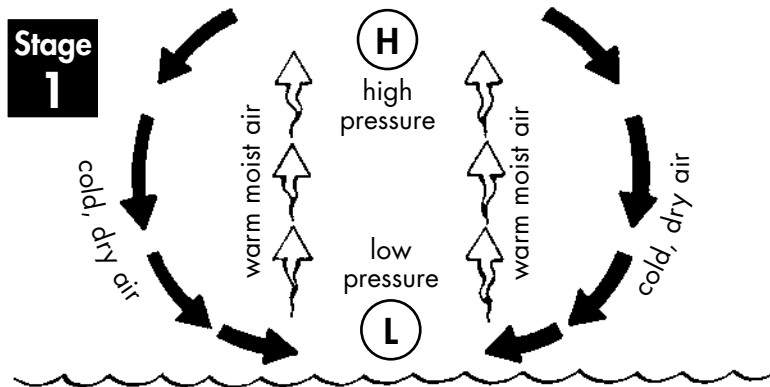
As hurricanes approach shore, the combination of high winds and low **air pressure** actually raises the level of the sea around the storm higher than normal. Scientists call this a **storm surge**. It extends for miles around the center of a hurricane and floods any low, coastal land. Flooding caused by a storm surge is a major source of property damage from hurricanes.

How Hurricanes Form

Hurricanes form over **tropical** oceans worldwide. These tropical storms tend to be seasonal. They usually form in the summers of the Northern and Southern Hemispheres.

The storms form when energy from the Sun heats ocean water near the equator.

Warm, moist air evaporating from the ocean is lighter than the cold, dry air above it. The warmer air pushes up through the cooler air, which then sinks down to take the place of the warmer air. The process creates a low-pressure area called a **tropical depression**.

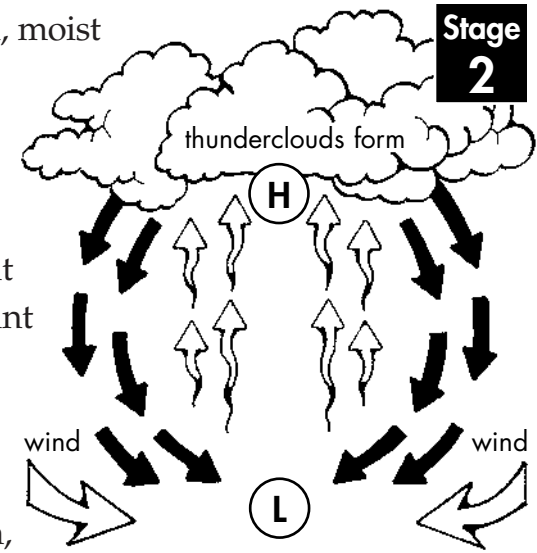


Do You Know?

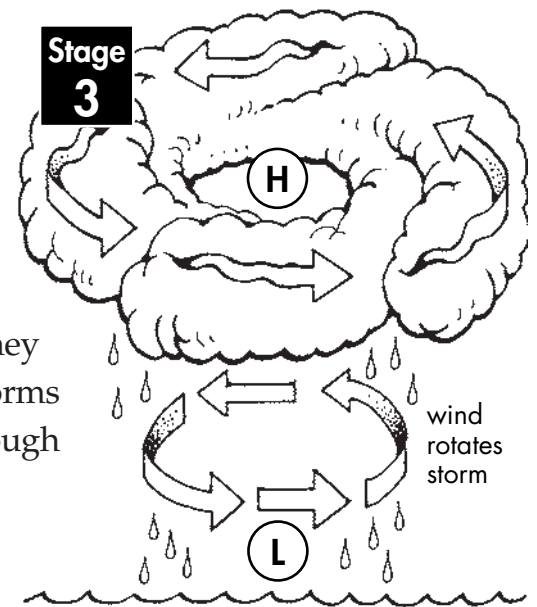
In the Northern Hemisphere hurricane winds rotate counterclockwise, while in the Southern Hemisphere hurricane winds rotate clockwise.

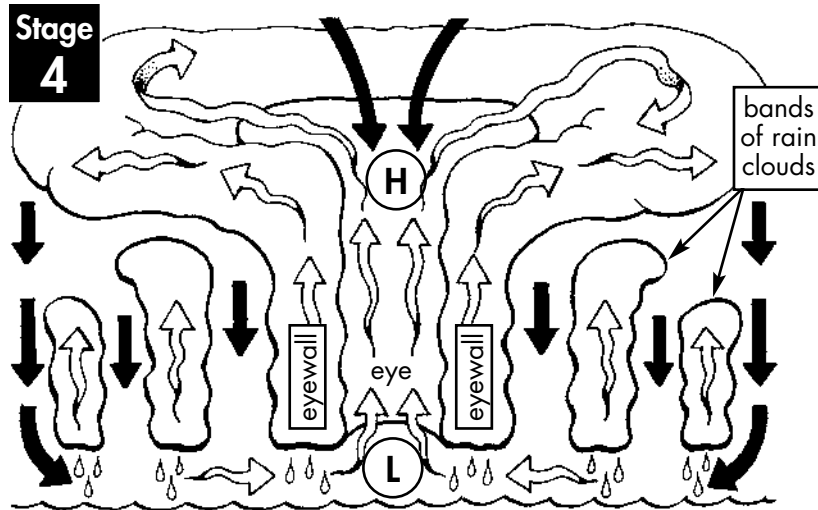
As the warm, moist air rises, it cools and **condenses**, a process that creates clouds and releases heat energy. Soon giant thunderclouds form.

Wind begins to rotate, or spin, around the low-pressure area.



The wind starts blowing harder, and when it reaches about 62 kilometers per hour (39 mph), the tropical depression becomes a **tropical storm**. Tropical storms can grow into hurricanes if they soak up more heat energy from the warm oceans they pass over. Some storms don't ever gain enough energy to become hurricanes.





If a tropical storm does gain more energy, wind speed picks up and thick spiral bands of clouds spread out from the center of the storm. When wind speeds are greater than 119 kilometers per hour (74 mph), the storm officially becomes a hurricane.

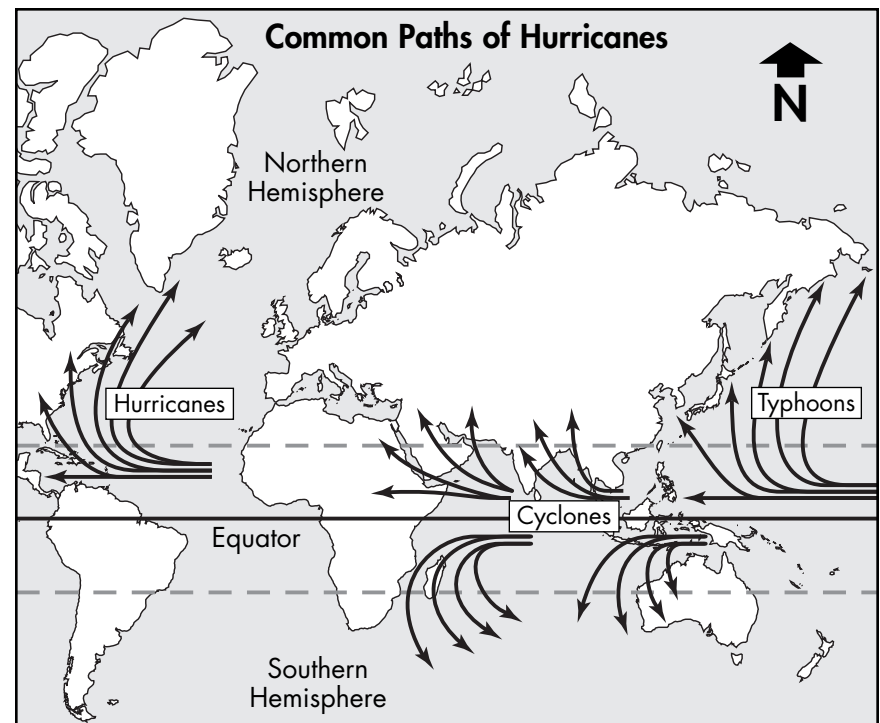
Naming System

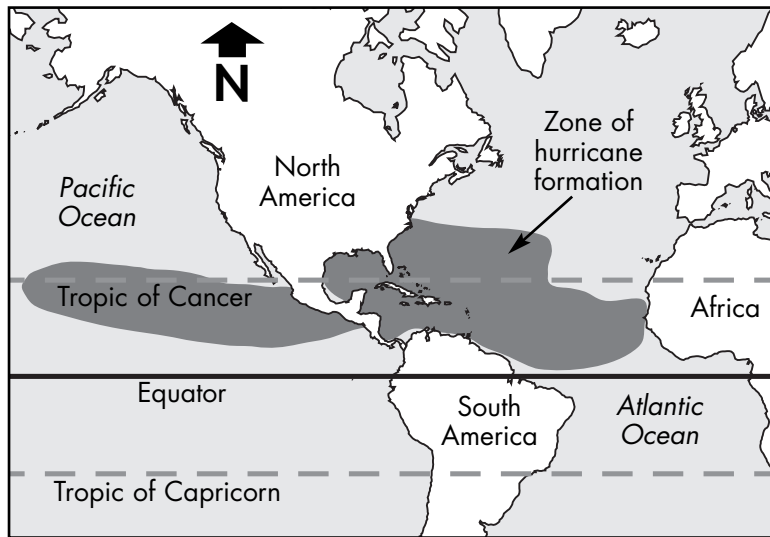
When a tropical storm officially becomes a hurricane, it is given a name. The yearly name lists for each region of the globe reflect all nationalities because hurricanes affect people in many countries. Here were the names for Atlantic Ocean hurricanes for 2004:

Alex	Bonnie	Charley
Danielle	Earl	Frances
Gaston	Hermine	Ivan
Jeanne	Karl	Lisa
Matthew	Nicole	Otto
Paula	Richard	Shary
Tomas	Virginie	Walter

Generally, hurricanes in the Northern Hemisphere move west, then north, and then they turn toward the northeast. This path takes hurricanes away from the equator and away from the warm ocean water that fuels them. In the Southern Hemisphere hurricanes typically travel west, south, and then turn southeast, which also takes them away from warm ocean water.

As hurricanes move over cooler water and over land, they lose much of their energy. The wind slows down, and the storms eventually **disperse**.





Where Hurricanes Form

Central America, islands in the Caribbean, and the East Coast of the United States are hit by hurricanes almost every year. Rarely do hurricanes hit the U.S. West Coast. Atlantic Ocean hurricanes get started southeast of the Caribbean Sea. In the Pacific Ocean typhoons most often hit Asia and Indonesia. In the Indian Ocean, severe tropical cyclones affect Australia, the Middle East, parts of Asia, and the eastern coast of Africa. During hurricane season (which can last six months or more), meteorologists keep a careful watch on tropical depressions and tropical storms hundreds of miles offshore to see if any will become hurricanes.

How Hurricanes Are Classified

A tropical storm has **sustained** winds of 62–119 kilometers per hour (39–74 mph). When a tropical storm has sustained winds greater than 119 kilometers per hour (74 mph) it is classified as a hurricane.

Meteorologists classify hurricanes according to their **intensity** using the Saffir-Simpson Hurricane Scale. The scale goes from 1 to 5 and helps describe the kind of damage and dangers of each category of hurricane.

Category One hurricanes have winds of 119–153 kilometers per hour (74–95 mph). They cause little damage to buildings and minor damage to vegetation.



Damage from Charley, a Category One hurricane

Category Two hurricanes have winds of 154–177 kilometers per hour (96–110 mph). They tear away roofing material, damage doors and windows of buildings, and uproot plants. Boats in unprotected areas often break away from docks.



Flooding from Floyd, a Category Two hurricane, stranded these pigs on a roof.

Category Three hurricanes have winds of 178–209 kilometers per hour (111–130 mph). They cause structural damage to small buildings and destroy mobile homes. Areas lower than 1.52 meters (5 ft.) above sea level may be flooded as far as 13 kilometers (8 mi.) or more inland.



Damage from Alicia, a Category Three hurricane in 1969

Category Four hurricanes have winds of 211–249 kilometers per hour (131–155 mph). They cause building walls to collapse and major erosion of beaches. Areas lower than 3 meters (10 ft.) above sea level may be flooded, requiring massive evacuation of residential areas as far as 9 kilometers (6 mi.) inland.



In 1992, Andrew, a Category Four hurricane, became the costliest disaster in U.S. history.

Category Five hurricanes have winds of greater than 249 kilometers per hour (155 mph). The strongest hurricanes cause extensive damage to houses and industrial buildings. Massive



In 1969 Camille, a Category Five hurricane, became the most intense storm to strike the U.S. mainland in modern history.

evacuation of residential areas on low ground within 8–16 kilometers (5–10 mi.) of the shoreline may be required.

Historic Storms

The most destructive hurricanes have been powerful and slow moving. Many have destroyed major cities in their paths. Here are some famous hurricanes, typhoons, and cyclones.

Name	Ocean (Areas Most Affected)	Year	Deaths
Calcutta*	Indian (India)	1864	70,000
Galveston*	Atlantic (United States)	1900	6,000–8,000
Vera	Pacific (Japan)	1958	5,000
Bangladesh*	Indian (Bangladesh, India)	1970	300,000–500,000
Thelma	Pacific (Philippines)	1991	5,101–8,000+
Mitch	Caribbean (Caribbean, Central America)	1998	11,000

*No actual name given. Labeled by area worst hit.

Source: <http://hurricanes.noaa.gov>



Damage from hurricane Mitch, a Category Five storm

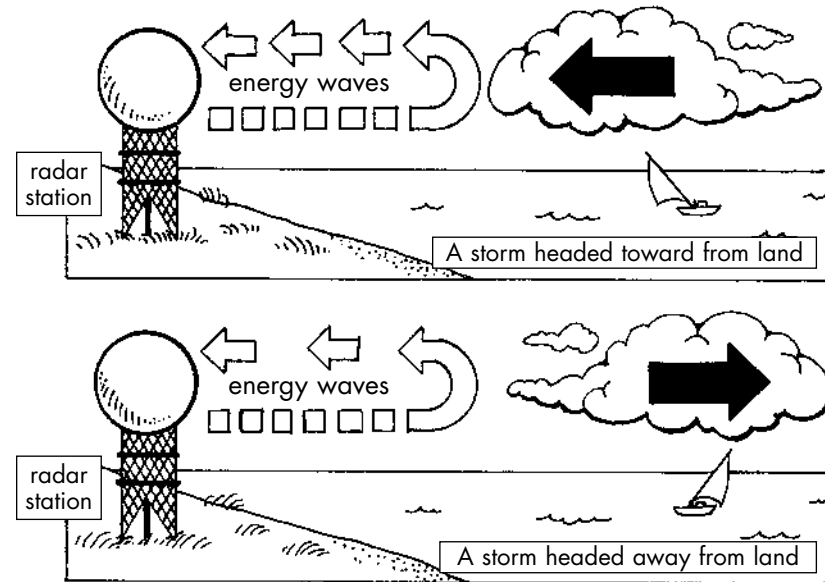
How We Study Hurricanes

We use satellites to locate and track tropical depressions, tropical storms, and hurricanes while they are far out at sea. Satellites orbiting high above Earth take frequent pictures of a hurricane. Scientists study the differences in the pictures to measure changes in a storm's movement and intensity. High clouds within strong hurricanes show up on pictures from satellites as colder than the surrounding area.

The most dramatic hurricane study tool is the "Hurricane Hunter." This is a specially designed aircraft that flies into the eye of a hurricane to make direct measurements of temperature, moisture, wind speed, and direction.



C-130 Hurricane Hunter



Doppler radar also helps track storms. Weather forecasters on television news programs use it to show local rainfall. Wide-range Doppler radar shows a hurricane's wind speed as it approaches land.

Doppler radar stations send out short bursts of energy waves. Rain and clouds reflect these waves back to the station. Rain and clouds coming toward land from a hurricane reflect back different waves than rain and clouds headed away from land. A computer analyzes the differences in the waves to create a model of a storm. Scientists use the model to show the speed and direction of a storm.

How We Predict Hurricanes

Computers are used to predict hurricane movements. Thousands of measurements are typed into super-computers to predict where a storm will go. As computers improve, we will be able to more accurately predict where hurricanes will hit land. This will save lives and reduce unnecessary evacuations. But computers will never be 100 percent accurate because weather systems are **chaotic** and are often difficult to predict.

Some researchers believe it is possible to stop hurricanes from forming or to redirect them. One possible way to do this is by seeding clouds in broad areas where hurricanes are born. During seeding, airplanes spray a fine mist of salt powder, which helps water condense out of the air. This would create many small clouds that would use up the energy that might be tapped by a single large storm to become a hurricane. The problem is that in order to be effective, clouds would have to be seeded over areas the size of Texas. No one yet has come up with a plan that would prevent a hurricane from forming.



Cloud seeding

How to Prepare for Hurricanes

These steps can help protect lives and property during a hurricane.

- Keep emergency supplies such as a first aid kit, flashlight, drinking water, and canned food.
- Keep a battery-powered radio to listen to if the power goes out. Follow the instructions you receive over the radio with each elevated warning.
- Keep your car's gas tank full in case you need to evacuate.
- If you are in the path of a hurricane and you have time, protect your house by nailing plywood over windows. Tie down loose objects outside.
- Have a family evacuation plan. Include in the plan when to leave, where to go, how you will get there, and what to do if your family becomes separated.
- Leave as soon as you are ordered to evacuate.



Conclusion

Hurricanes are an awesome display of nature's power. Satellites can tell us much about these storms, such as the direction a hurricane is moving and what areas need to be evacuated. We may be able to predict the path of hurricanes, but it is unlikely that we will ever be able to stop them. We can protect ourselves by planning where and how we build our homes, by keeping emergency supplies, and being prepared to evacuate if necessary.

Explore More

On the Internet use *www.google.com* to find out more about topics presented in this book. Use terms from the text, or try searching for glossary or index words.

Some searches to try: *hurricanes, storm surge, or typhoons.*

Glossary

air pressure	the pressure of air in the atmosphere (p. 8)
Caribbean	referring to the native people of the islands of the Caribbean Sea (p. 6)
chaotic	random, without an orderly pattern (p. 20)
condenses	to change from gas to liquid or from one substance to a denser form (p. 10)
disperse	to break up or scatter (p. 12)
evacuate	to move people out of danger (p. 5)
eye	the center of something, such as a hurricane (p. 6)
eyewall	the wall of clouds and rain around the eye of a hurricane (p. 6)
hurricane watch	a formal warning that hurricane conditions are possible in the area of the watch (p. 4)
intensity	the degree of force or strength (p. 14)
satellite	a vehicle that orbits the Earth (p. 4)
storm surge	a quick rise of the ocean's level, caused by strong winds and a drop in air pressure during a hurricane (p. 8)
structure	the relationship of parts in how something is constructed (p. 6)
sustained	to keep up without stopping (p. 14)
tropical	of, or occurring in, the tropics (p. 9)

tropical depression	a low-pressure weather system with sustained cyclonic winds of less than 62 kilometers per hour (39 mph) (p. 9)
tropical storm	a low-pressure weather system with sustained cyclonic winds of 62–119 kilometers per hour (39–74 mph) (p. 10)

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Name _____

INSTRUCTIONS: Re-read chapter three, "How Hurricanes Form," to complete this worksheet. Then write in correct order the cause and effect of each stage in the formation of a hurricane.

Cause	Effect
1 →	
2 →	
3 →	
4 →	

Name _____

INSTRUCTIONS: Write the words to show how you would read these numbers and abbreviations aloud.

Example: 6.25 ft. six point two five feet

26–30 mi. twenty-six to thirty miles

10–15 mph _____

7.5 in. _____

877 mi. _____

2.36 ft. _____

155 mph _____

22 ft. _____

74–95 mph _____

8 mi. _____

5–7 ft. _____

0.62 in. _____

Name _____

INSTRUCTIONS: The sentences below are from the book *Hurricanes*. Circle the verb in each sentence. Then choose an adverb from the word box that best describes the verb, and write it on the line provided. Use your book to check your answers.

rarely

accurately

rapidly

harder

generally

soon

finally

officially

eventually

specially

As computers improve, we will be able to more _____ predict hurricanes.

This is a _____ designed aircraft that flies into the eye of a hurricane.

_____, the storm moves inland and the wind slows down.

The upward-moving air _____ cools, and rain begins to fall.

_____ the eye will move, and then the sudden force of the storm will hit.

The wind starts blowing _____, and the tropical depression becomes a tropical storm.

When the wind speeds are greater than 74 mph, the storm _____ becomes a hurricane.

The wind slows down, and the storms _____ disperse.

_____, hurricanes in the Northern Hemisphere move west, then north.

_____ do hurricanes hit the U.S. West Coast.

Threats to Our Atmosphere

A Reading A-Z Level W Leveled Reader

Word Count: 1,831

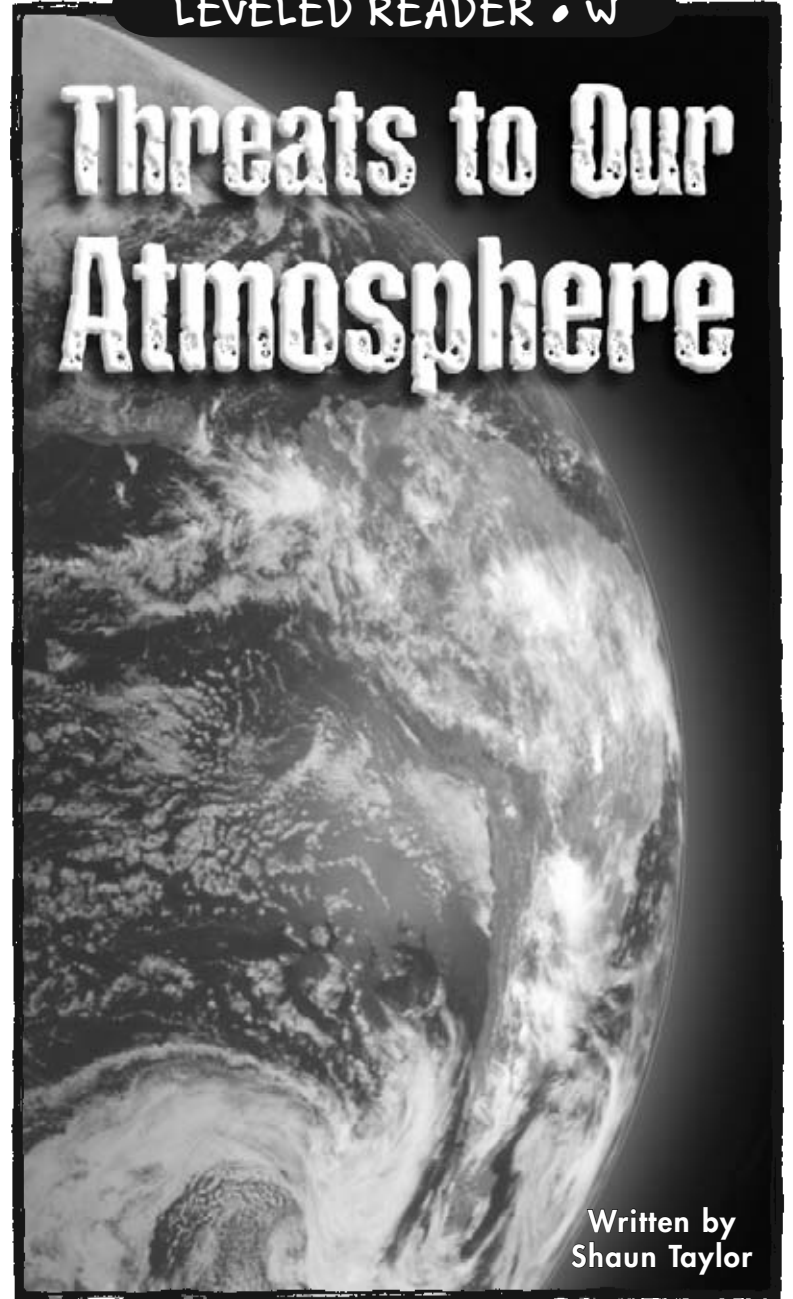


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Threats to Our Atmosphere



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Shaun Taylor

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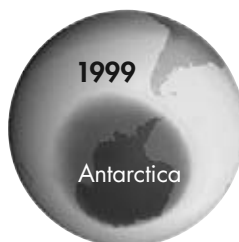
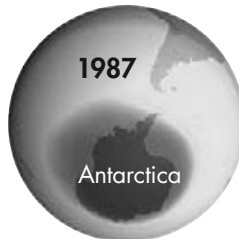
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Earth's atmosphere as seen from a satellite

Introduction

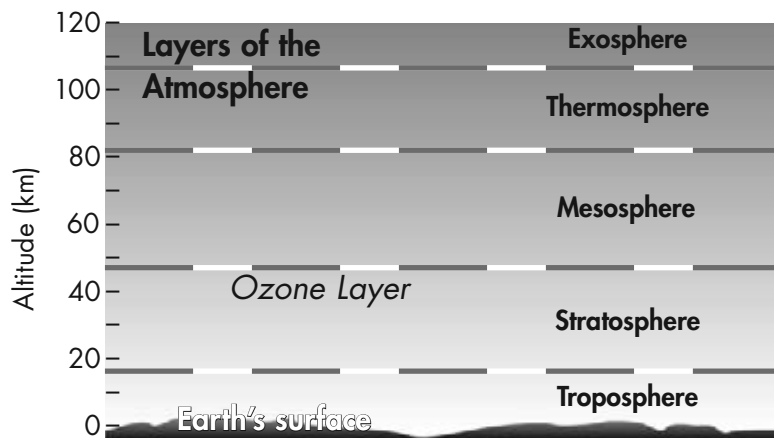
There is a protective blanket around Earth called the **atmosphere**. The atmosphere is a mixture of many gases. The three most important are nitrogen, oxygen, and carbon dioxide. Living things need these gases in order to live. Our Earth's atmosphere filters out the sun's harmful rays and prevents heat from escaping too rapidly into space.

Living things on Earth survive within a narrow range of conditions. All living things need the right amount of gases, the right range of temperature, and the right amount of sunlight. The atmosphere helps to maintain proper conditions for life on Earth.

The Earth's Atmosphere

Earth's atmosphere is divided into five layers. As you move up through the layers, conditions change. The atmosphere gets colder and thinner as you move away from Earth's surface.

The closest layer to the ground is the *troposphere*. This is where clouds form, and **precipitation** occurs. The next layer is the *stratosphere*. It extends about 50 kilometers (30 miles) above the ground. Commercial airliners fly about 11 kilometers (6.84 miles) into the calmer, lower layers of the stratosphere. Next are the *mesosphere* and *thermosphere*, which are from 50 kilometers to above 90 kilometers (30–56 miles) above the Earth's surface. The very thin, outermost layer of the Earth's atmosphere is the *exosphere*.



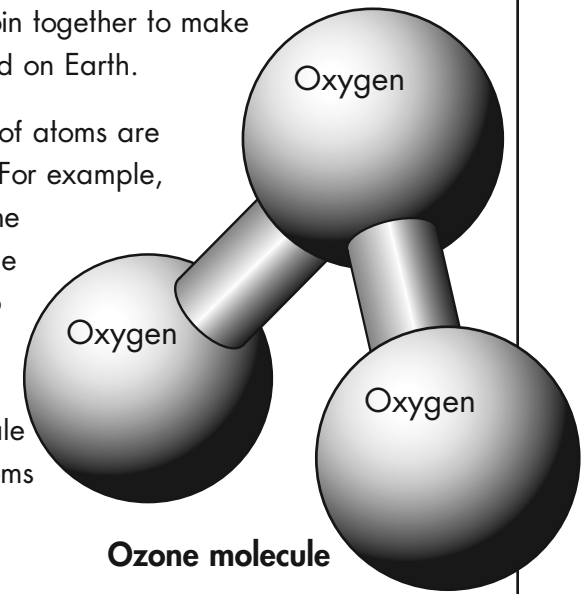
The Ozone Layer

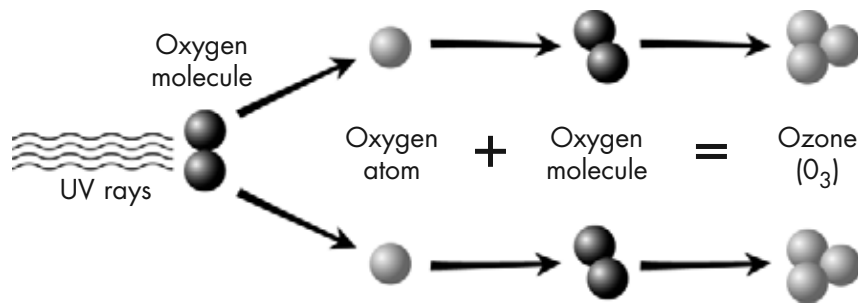
Ozone is a special form of oxygen gas. Different amounts of ozone are found in each of the five layers of the Earth's atmosphere. There is a lot of ozone in the upper part of the stratosphere so it is considered a sublayer called the ozone layer. This sublayer absorbs harmful **ultraviolet** rays from the sun. This is called "good ozone" because it protects us.

Do You Know?

Atoms are the tiny particles that make up all matter in the universe. There are 101 natural substances on Earth called elements. Each element has its own type of atom. Atoms join together to make all the things found on Earth.

Combinations of atoms are called molecules. For example, one molecule of the oxygen we breathe is made up of two atoms of oxygen, or O_2 . Ozone is an oxygen molecule made of three atoms of oxygen, or O_3 .





UV rays break down normal oxygen molecules into two separate atoms. Those atoms then combine with other oxygen molecules to make ozone.

Ozone in the ozone layer is continually created and destroyed. It is important that the amount of ozone remains fairly **constant**, which means that the balance does not shift too greatly one way or the other.

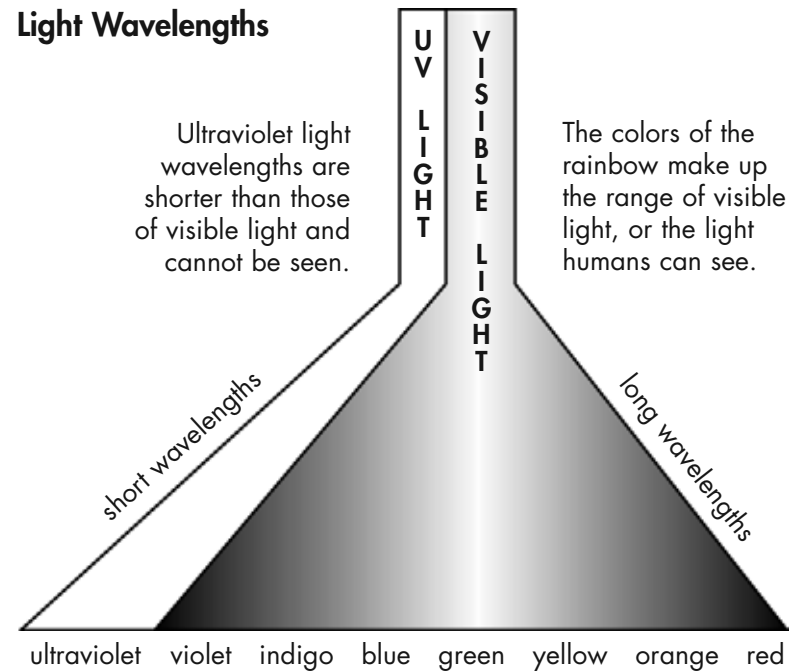
The part of sunlight known as ultraviolet (UV) light is responsible for creating and destroying ozone. UV light creates ozone by splitting **molecules** of oxygen gas (O₂), into two individual oxygen **atoms**. If one of these oxygen atoms joins with a molecule of oxygen gas, a three-atom molecule called ozone (O₃) forms. UV light can also change an existing ozone molecule by removing one of its oxygen atoms. The freed oxygen atom then reacts with an ozone molecule (O₃) causing it to split into two oxygen molecules (O₂ + O₂).

Do You Know?

Sunlight is actually a mixture of visible and invisible light of various wavelengths. The visible light is made of different colors from red to violet. Long wavelengths are less powerful and produce red light. Shorter wavelengths are more powerful and produce blue and violet light. Light eventually becomes invisible as the wavelengths decrease.

Invisible ultraviolet light is powerful and can cause skin cancer, damage the eyes and plants, and kill ocean life. Some biologists believe that increased ultraviolet light is bleaching the color out of corals around the world.

Light Wavelengths



This continual creation and destruction of ozone keeps the amount of ozone in the ozone layer fairly constant. The layer of ozone created keeps harmful UV light from reaching Earth's surface.

Ozone also forms near the ground. This ozone is harmful to plants and animals and is called "bad ozone." It forms when cars and factories release **chemicals** called **pollutants** into the air. On hot days, sunlight starts a reaction between the pollutants and oxygen causing the formation of bad ground-level ozone.



Factory smoke stacks release chemicals into the air.

If levels of ground-level ozone rise to dangerously high levels, a warning is sent out. People with breathing problems are told to stay inside.

Discovery of the Ozone Hole

In the 1970s, scientists in Antarctica measured an increase in the ultraviolet (UV) light reaching Earth. Later, satellites confirmed that UV light in some areas was not being absorbed by the ozone layer as much as it had been in previous years. From the satellite data, scientists made maps that showed a hole in the ozone layer over the South Pole.

By 1994, the ozone level had dropped to one half of what it was in the 1970s. There were signs that the ozone hole discovered above Antarctica was expanding past the polar region toward the equator where more people lived. The ozone hole was becoming a threat to people and the environment.

Math Minute

A one-percent decrease in ozone in the stratosphere will cause a two-percent increase in UV-B light that reaches the ground. If ozone in the stratosphere decreases by ten percent, what is the increase in the percentage of UV-B light reaching the ground?

$$\begin{aligned} 1 &= 3+5+2=10-4+10\div 2=14\times 2-3=25-5-5 \\ 2 &= 17+3\times 2-20\div 2-1 \\ 3 &= 3+5+2=10-4+10\div 2=14\times 2-3=25-5-5 \\ 4 &= 17+3\times 2-20\div 2-1 \end{aligned}$$

Ozone destruction is greatest around the North and South Poles during winter due to the winds and low temperatures common to polar regions. During spring and summer the ozone layer rebuilds. (Winter in Antarctica, or the South Pole, occurs during the summer for the Arctic, or North Pole.)



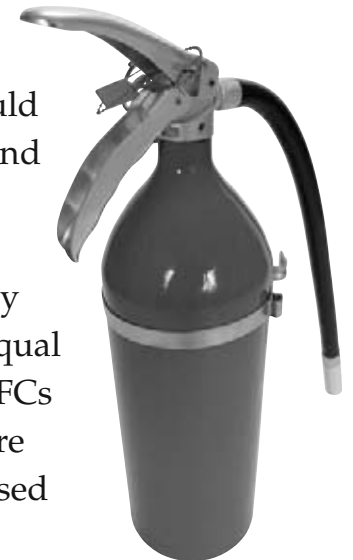
Scientists in Antarctica launch an instrument that will measure the ozone layer.

The Cause of the Ozone Hole



Scientists searched for causes of the changing ozone levels. They discovered that some factories release chemicals called CFCs, or chlorofluorocarbons, that could destroy ozone. The element chlorine in CFCs was the main problem. Since CFCs were used in air conditioners, insulating foams, and spray paint, large amounts of chlorine were released into the atmosphere.

Scientists also learned that another chemical, bromine, could destroy ozone. Bromine is found in substances that are known as ODCs, or Ozone Depleting Chemicals. Bromine can destroy 45 times more ozone than an equal amount of chlorine found in CFCs (chlorofluorocarbons). ODCs are frequently used in chemicals used to control fires.



fire extinguisher



Erupting volcanoes are one natural source of chemicals that destroy ozone.

CFCs and ODCs rise into the stratosphere where sunlight breaks these molecules into chlorine and bromine atoms. The chlorine and bromine then break down ozone molecules. One chlorine atom can destroy 100,000 ozone molecules. The process stops when the chlorine and bromine drift into space.

Natural sources of chemicals also can destroy ozone. One source is erupting volcanoes, which spread hydrochloric acid high into the stratosphere where it breaks down into ozone-destroying chlorine gas. While volcanoes and other natural causes do destroy the ozone, CFCs and ODCs from industry cause most of the damage.

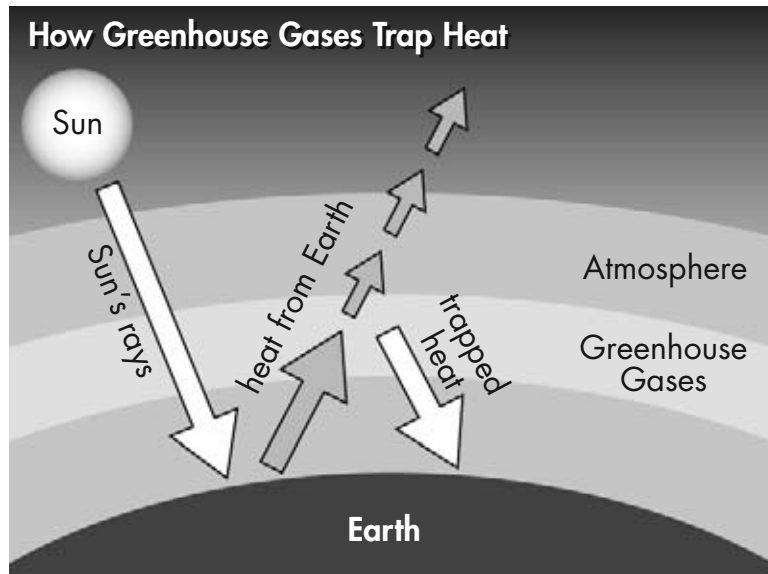
The World Responds

Even after ozone destruction was connected to CFCs and ODCs, many countries continued to produce them. These chemicals were so useful that nobody wanted to give them up. It took cooperation between the governments of many nations to address this global problem.

Countries joined together in 1987 and signed the *Montreal Protocol*. This agreement called for reducing and later banning the production of CFCs and ODCs by 1996. This is a success story because it is the first time that many nations have tackled an environmental issue on a global scale. As a result, since the year 2000, CFCs and ODCs in the atmosphere have been decreasing. However, it may take years to tell whether or not the ozone layer will fully recover.



Delegates from around the world get together each year to make sure countries are doing what they promised.



Global Warming

Engineers quickly developed alternative chemicals to CFCs and ODCs in hopes of restoring the ozone layer. However, some of the alternative gases that are ozone friendly are also powerful greenhouse gases. Greenhouse gases such as carbon dioxide and methane, when released into the atmosphere, are able to trap heat near Earth's surface in the same way glass traps heat in a greenhouse. The result is a condition known as the **"greenhouse effect."** Some scientists think that the greenhouse effect has caused the temperature of the air around Earth to gradually rise.



If the Earth becomes hotter, there is a possibility that polar ice will melt and break off into the sea, raising the ocean's water level.

The Earth has warmed by one degree over the last one hundred years. That may not seem like a lot, but scientists do not want global warming to become a trend that over time might cause the temperature to rise higher and higher.

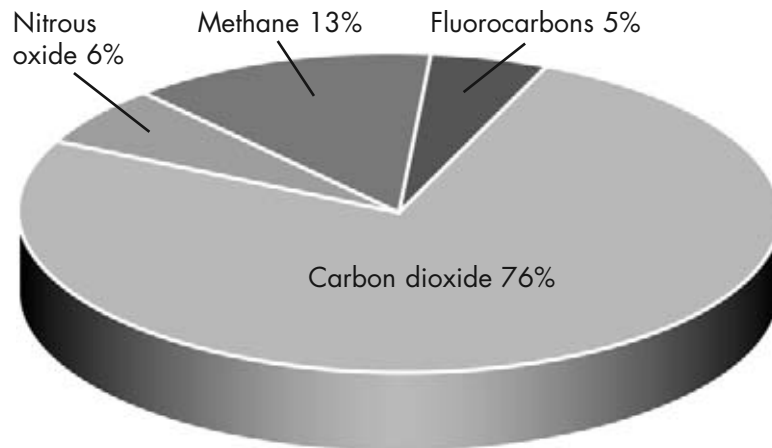
A hotter Earth may lead to the melting of the polar ice caps and warming of the oceans. This would cause the world's oceans to rise and would flood land near the coast, destroying habitats of living things. A warmer Earth would also create changes in weather patterns that could lead to habitat destruction and the deaths of some plants and animals. Some living things, such as the oceans' corals, would find it hard to find other places to live. The destruction of coral reefs would destroy the habitat of many ocean animals.

Greenhouse Gases

There are four gases that cause **global warming** when they are released into the atmosphere. They are called greenhouse gases—carbon dioxide, methane, nitrous oxide, and fluorocarbons.

Some scientists believe carbon dioxide causes about three-fourths, or 76 percent, of the increase in global warming. Cars and other machines that use gas-powered motors, as well power plants, produce carbon dioxide by burning **fossil fuels** such as coal, oil, and natural gas. As more cars, planes, trucks, and trains are driven, more carbon dioxide is released into the atmosphere. All of this leads to greater global warming.

Greenhouse Gases



Some scientists think these four gases are responsible for current trends in global warming.

Methane is responsible for about 13 percent of global warming. Methane is produced naturally in swamps and by livestock passing gas. It is also a product of rotting garbage.

Nitrous oxide is the third-worst **contributor** to global warming. Nitrous oxide is found mostly in fertilizers. The nitrogen in fertilizers is an important plant food, but when it mixes with soil it produces nitrous oxide. Nitrous oxide also is produced when animal waste **decomposes**.

The final contributor to global warming is fluorocarbon gases. Fluorocarbons also contribute to the destruction of ozone. Fluorocarbons rarely occur in nature. They are almost totally human-made so their production can be prevented.



Rotting garbage at landfills produces methane, a greenhouse gas.



Carpooling and taking public transportation would reduce the amount of carbon dioxide released into the atmosphere by gas-powered cars and trucks.

World Debate

Not everyone agrees on the seriousness of the global warming problem. Some say that a one-percent rise is nothing to be concerned about. Others think that the problem will worsen and that people ought to take steps now to prevent future global warming. These people believe that we should find ways to reduce greenhouse gas production before it is too late.

Reducing the amount of greenhouse gases may also slow down the destruction of the ozone layer. Global warming of the lower atmosphere actually cools the upper atmosphere. This cooling leads to conditions that can cause



Using bicycles instead of cars helps decrease the amount of greenhouse gases being produced.

further breakdown of the ozone layer. So, if we can learn how to decrease the production of greenhouse gases, we might prevent further destruction of the ozone layer.

There are no definite answers to the global warming problem, but some scientists around the world are looking into solutions. They feel it is in everyone's best interest to understand as much as possible about decreasing the release of greenhouse gases.

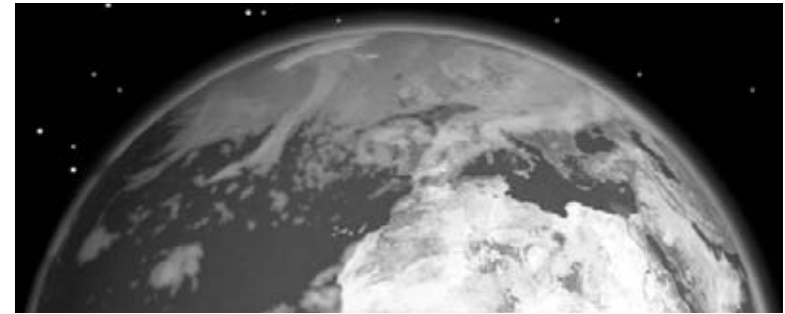
What You Can Do To Help

Governments and industries around the world have taken steps to reduce ozone-destroying chemicals. There are also things that we can do as individuals to protect the atmosphere. We can stop producing more ground-level ozone by reducing the use of automobiles. We can walk, car pool, ride buses, and shop for fuel-efficient vehicles. We can use newspapers to start barbecues instead of using lighter fluid, and use hand-powered mowers.

Protecting the upper-level ozone layer means trying to avoid releasing CFCs and ODCs into the atmosphere. Recycle the chemicals that cool old refrigerators and air conditioners. Avoid foam packaging if possible. Write letters to industries that still use CFCs and ODCs, and ask them what they are doing to find alternatives.



Using public transportation helps decrease ozone depletion.



Conclusion

Factories and certain products we use release chemicals that are destroying part of the protective blanket surrounding Earth. The chemicals being released into the air may be causing Earth's atmosphere to warm up. Actions taken by governments from all around the world have helped ban certain chemicals. However, more action is needed to prevent future harm to our atmosphere.

The ozone problem has taught us many things. We now know that we need to control the use of certain chemicals. It has brought scientists, politicians, and concerned citizens together to work on common goals. Perhaps the most important thing it has taught us is that we need to start thinking about how our current activities might affect not only people today, but also our future well-being and the health of our planet.

Glossary

atmosphere (<i>n.</i>)	the gas surrounding a celestial body, such as Earth (p. 4)
atoms (<i>n.</i>)	the smallest particles of elements that can exist alone (p. 7)
chemicals (<i>n.</i>)	substances of a certain kind that are formed when two or more substances act upon one another (p. 9)
constant (<i>adj.</i>)	steady, not changing (p. 7)
contributor (<i>n.</i>)	someone or something that has a share in something (p. 18)
decomposes (<i>v.</i>)	breaks down in decay (p. 18)
fossil fuels (<i>n.</i>)	organic substances, such as coal and oil, found underground and used as a source of energy (p. 17)
global warming (<i>n.</i>)	an increase in the temperature of Earth's atmosphere, especially a rise great enough to change the climate (p. 17)
greenhouse effect (<i>n.</i>)	process by which heat is trapped inside Earth's atmosphere by gases (p. 15)
molecules (<i>n.</i>)	the smallest parts of a substance that are formed when two or more atoms are held together (p. 7)
pollutants (<i>n.</i>)	things that cause something to no longer be pure (p. 9)
precipitation (<i>n.</i>)	different forms of water that fall to the ground, such as hail, sleet, rain, snow, or mist (p. 5)
ultraviolet (<i>adj.</i>)	relating to a form of light energy that cannot be seen (p. 6)

Explore More

On the Internet use *www.google.com* to find out more about topics presented in this book. Use terms from the text, or try searching for glossary or index words.

Some searches to try: *global warming*, *ozone hole*, or *CFCs*.

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Name _____

INSTRUCTIONS: Before you read *Threats to Our Atmosphere*, choose a topic from the book. Write what you already know about the topic in the first box. In the second box, write what you would like to learn. After you finish reading, fill in the third box with what you learned from the book.

Topic:
What I Know
What I Want to Know
What I Learned

Name _____

INSTRUCTIONS: The sentences below are from *Threats to Our Atmosphere* and contain a compound predicate. On the lines below each sentence, write two separate sentences using the same subject. Each new sentence should have only one predicate from the original sentence. The first one is started for you.

1. Long wavelengths are less powerful and produce red light.

Long wavelengths _____

Long wavelengths _____

2. Shorter wavelengths are more powerful and produce blue and violet light.

3. Invisible ultraviolet light is powerful and can cause skin cancer, damage the eyes and plants, and kill ocean life.

4. The rising water levels would flood land near the coast and destroy habitats of living things.

5. Others think that the problem will worsen and that people ought to take steps now to prevent future global warming.

Name _____

INSTRUCTIONS: Draw a line from each vocabulary word to its definition.

atmosphere

- substances of a certain kind that are formed when two or more substances act upon one another

atoms

- steady, not changing

chemicals

- someone or something that has a share in something

constant

- the smallest parts of a substance that are formed when two or more atoms are held together

contributor

- the smallest particles of elements that can exist alone

decomposes

- the gas surrounding a celestial body, such as Earth

fossil fuels

- relating to a short-wavelength form of light energy that cannot be seen

global warming

- forms of water that fall to the ground, such as hail, sleet, rain, snow, or mist

greenhouse effect

- process by which heat is trapped inside Earth's atmosphere by an excess of gases

molecules

- organic substances, such as coal and oil, found underground and used as a source of energy

pollutants

- things that cause something to no longer be pure

precipitation

- increase in the temperature of Earth's atmosphere, especially a rise great enough to change the climate

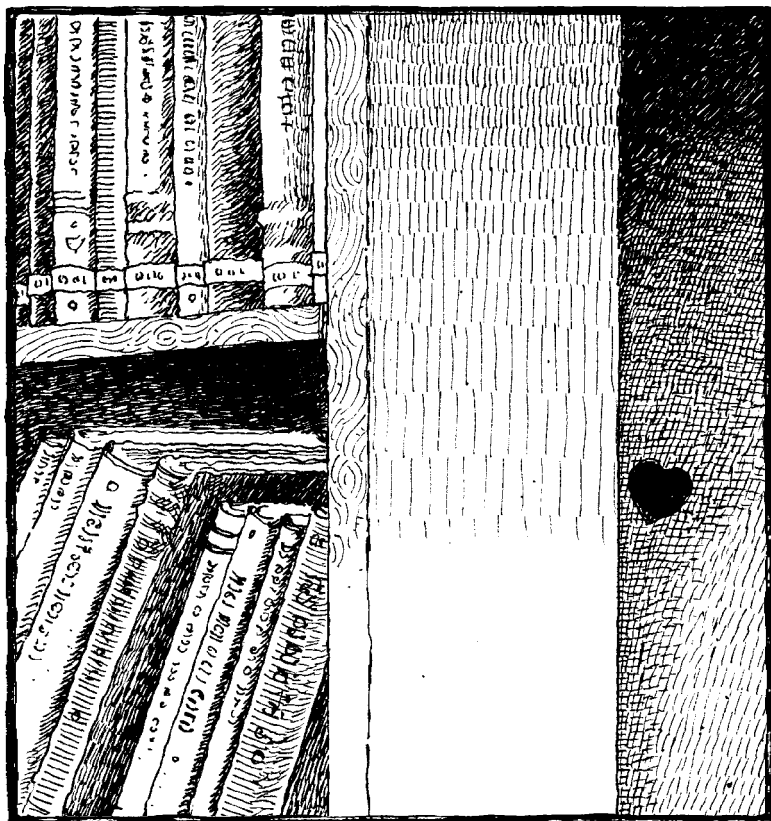
ultraviolet

- breaks down in decay

The Mystery of Granville Library

A Reading A-Z Level W Leveled Reader

Word Count: 2,400




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The Mystery of Granville Library



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Illustrated by Stephen Marchesi

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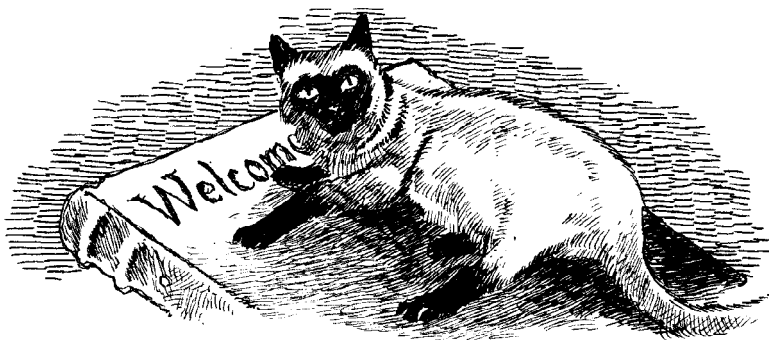
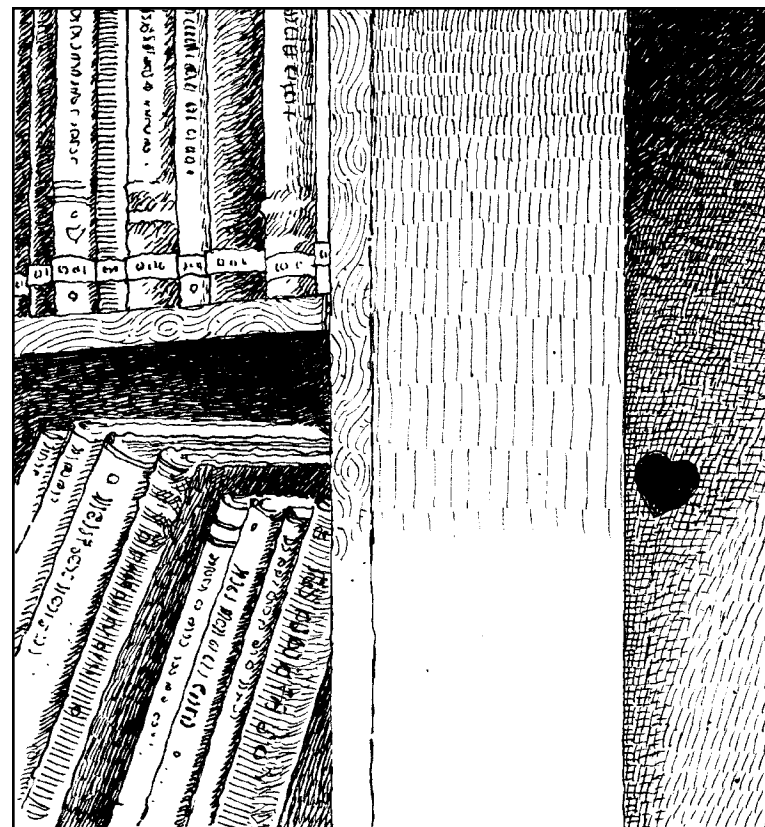


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Prologue

Sometimes the best things in life are hidden from us, and they will not appear unless we search them out. But, if we notice the clues around us and never give up our search, life's **mysteries** will reveal their **secrets** to us. This is the story of Daniel and his friends, who **discovered** just such a mystery—the mystery of Granville library.

King Arthur's Clue

"Hey Daniel, I found it!" Yuri whispered urgently.

"Are you sure?" Daniel asked.

"Yeah. *King Arthur and the Knights of the Round Table*. That's the one, isn't it?" Yuri asked.

"Yes. That's it. Let me see it," Daniel answered.

Daniel, Yuri, and Bennett were searching the Granville School library shelves after classes ended for the day. They were always looking for new books to read, but today Daniel was looking for a book that Yuri's mom suggested. She knew that Daniel would like the stories of King Arthur, which were full of knights, castles, battles, and honor.

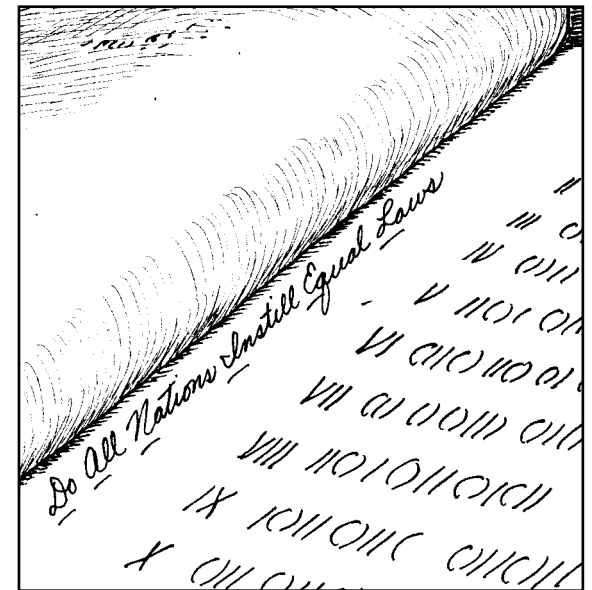
"Excellent, Yuri. Thank you," Daniel said as he took the book from his friend's hands. "I'm going to look through this. I'll meet you guys a bit later."

Yuri and Bennett headed off to the new book section of the library. They were always reading, each with their own interests. Daniel had met Yuri and Bennett at the public library when their moms had brought them for story hour. The three boys had been best friends ever since.

Daniel sat at one of the tables and placed his new **treasure** in front of him. The book's cover was faded to reddish brown with age, and the title had nearly disappeared. When he opened it, a faint smell of dust and ink emerged, like a closet full of newspapers on a warm day. Daniel flipped the first pages aside until he reached the **copyright** date. He always liked to know when books were published.

"Wow," he whispered to himself. "1959!" That was the year Daniel's grandfather started teaching at Granville.

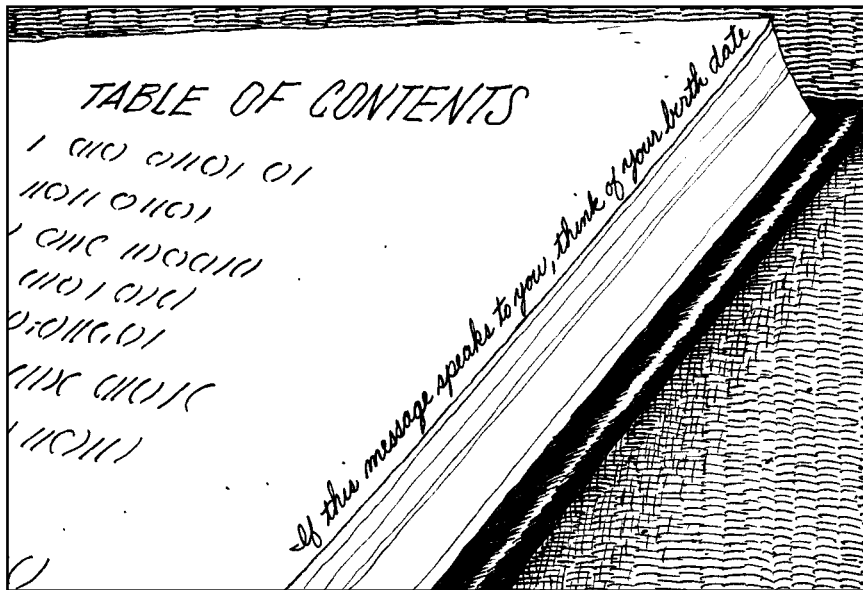
Daniel turned another page to the table of contents. As he scanned down the list of chapter titles, he was surprised to see a message lightly handwritten in pencil along the **binding**. The message read: *Do All Nations Instill Equal Laws?*



At first, Daniel thought a bored student had scribbled in the book during class. As he looked closer at the message, a familiar **pattern** appeared. Since Daniel had learned to read, he had played word games: crossword puzzles, word finds, and especially **acrostics**, where the first letter of a series of words spells out a new word. Daniel reread the message and saw a new meaning—his name:

Do All Nations Instill Equal Laws?

His vision shifted, taking in the rest of the page. Another handwritten message appeared in tiny letters along the right edge of the page:
If this message speaks to you, think of your birth date.



Birth Dates and Family Trees

Daniel heard footsteps behind him.

“Daniel, how’s the book?” Bennett quietly asked, walking up beside him with a couple of books in his hands.

“You guys! Look at this!” Daniel whispered. Yuri and Bennett leaned close to look at the page.

“Big deal,” Yuri said. “So someone wrote in a library book. It’s not the end of the world.”

“Ha! It would be if Mrs. Montoya caught them!” Bennett chuckled softly. As Granville librarian, Mrs. Montoya strictly enforced the rules, which the boys knew from talking too loudly about books they enjoyed.

“No, look closer at the message,” Daniel urged. As his friends crowded around him, Daniel showed them the acrostic spelling out his name. Then he pointed to the message at the bottom.

“So, what do you think?” he asked.

“Well, what’s your birthday?” Yuri answered.

“January eleventh,” Daniel responded. They all looked at the table of contents to see any signs of January or birthdays, but nothing seemed to match up.

Daniel took out a pen and paper and began making notes to himself. A moment later, he dropped the pen.

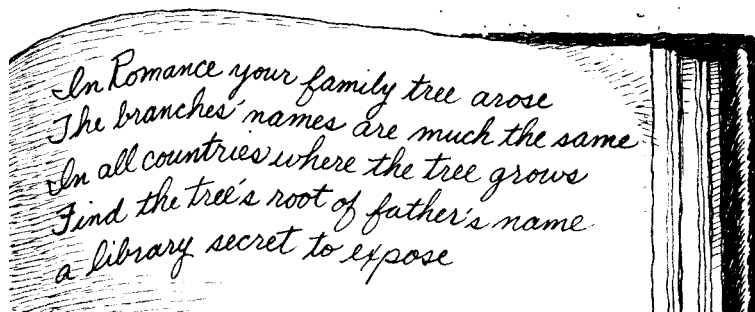
"I think I have it!"

"Shhh!" Yuri warned, looking for Mrs. Montoya. "What is it?" he asked quietly.

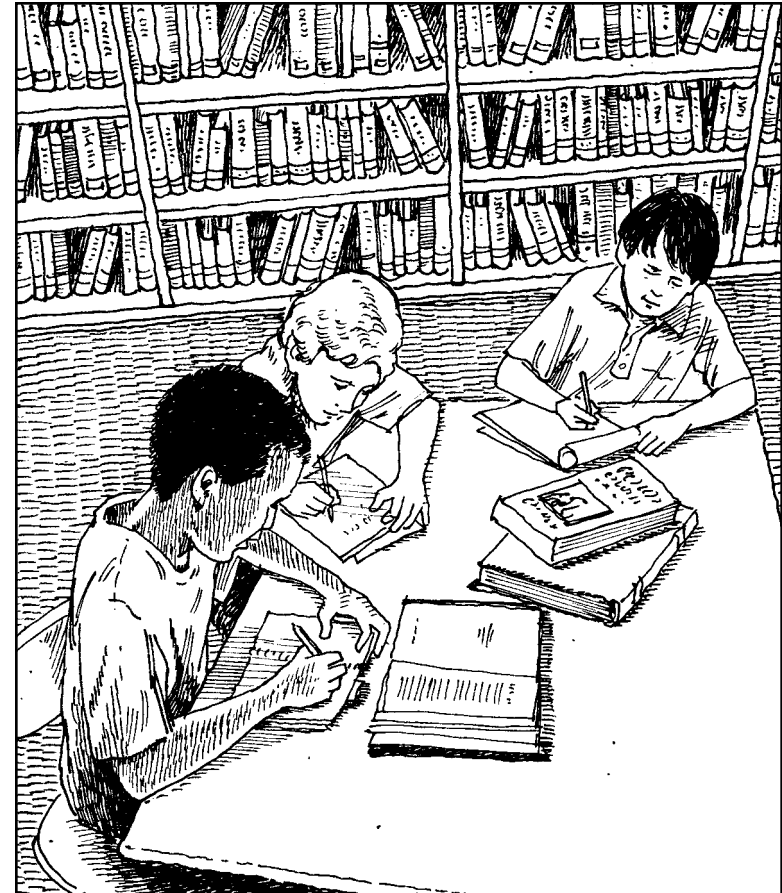
"Forget the word January," Daniel said. "Look what happens if I just give my birth date in numerals: 1/11."

Yuri and Bennett saw that chapter four began on page 111. Nodding to his friends, Daniel quickly flipped the yellowing pages to 111. The boys scanned the page for a message.

"Here!" Daniel whispered, pointing to neat, tiny handwriting, this time at the top of the page. Daniel turned the book so his friends could easily read the message. This message was longer, and written as a poem:



*In Romance your family tree arose
The branches' names are much the same
In all countries where the tree grows
Find the tree's root of father's name
a library secret to expose*



"What do you think of this?" Daniel asked.

"It doesn't make any sense right now," Bennett replied.

"I have an idea," Daniel said. "Let's each copy the poem down and take it home tonight. We'll meet here tomorrow at the same time and compare notes."

Getting to the Root of the Matter

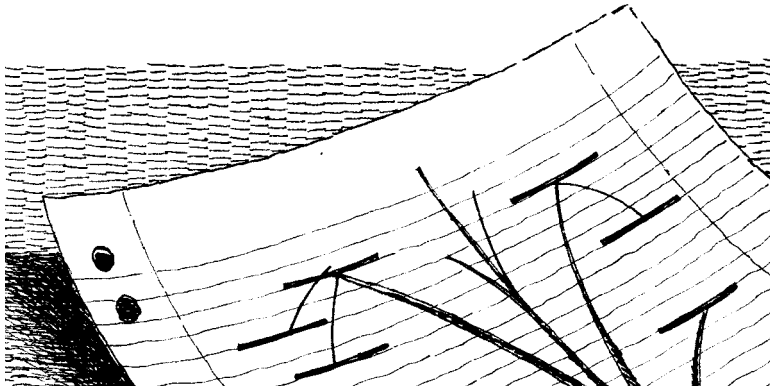
Right after classes, Daniel, Yuri, and Bennett gathered around the familiar library table and pulled out their notes.

"Man, I thought about this **riddle** for hours last night," Yuri complained, shaking his head.

"Me too," Bennett agreed. "So, what did you come up with?" he asked Yuri.

"Well, I kept thinking about the word 'romance' and family trees. The only romance in a family tree would be between a mother and father, right?" he asked. "So, I decided that the main branches of that tree would be the mother and the father."

"I thought the same thing," agreed Bennett. "But what about the line about branches' names are similar in whatever country that tree grows?"



"I think the key is the word 'romance,'" Daniel offered. "But not in the dating sense."

"What do you mean?" Bennett asked.

"The word *Romance* in the poem is capitalized," Daniel said. "Do you remember what my grandfather taught at Granville?"

"That's right!" Yuri said, quietly snapping his fingers.

"He taught Romance languages—Latin, French, Italian, and Spanish," Daniel continued. "They are called Romance languages because they share similar structures. That would explain why, in the poem, the branches' names are similar in different countries."

"Yeah," Yuri said. "You're right! The words for mother and father in those languages are nearly the same: *madre*, *mère*, and *mater* for mother, and *padre*, *père*, and *pater* for father."





"Right," Daniel agreed. "So then I noticed the line about the root of the tree and father's name."

"The root of all Romance languages is Latin," Bennett interrupted.

"Exactly," Daniel answered. "So, I think the answer to this riddle is the Latin root for the word father."

"The word *pater* sounds like the answer to the riddle," Yuri said.

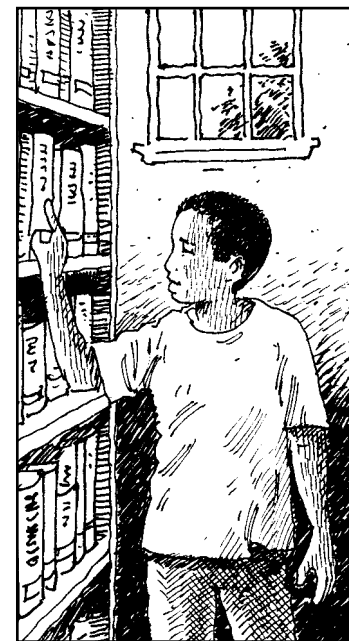
"The question is," Bennett said, "what does *pater* have to do with this mystery?"

Who Is Pater?

The three friends came up with nothing on the word *pater*. Finally, they decided to ask the librarian, Mrs. Montoya. After all, they reasoned, the riddle did mention a secret in the library. However, they agreed not to tell Mrs. Montoya about all the messages. She would not appreciate writing in books even if it was a puzzle to solve.

Mrs. Montoya told the boys of a famous book called *The Renaissance* by a writer named Walter Pater. It was about the greatest painters and poets of the **Middle Ages**, and the library had a copy of the book.

Anxious to find *The Renaissance*, the three went to the library's computerized book **catalog**. They typed in the title, *The Renaissance* and, sure enough, found the book written by Walter Pater. Noting the location, they strode over to the shelf where the book should be and began **scanning** the rows for the name to appear.





"Here it is!" Bennett whispered excitedly. Yuri and Daniel rushed over as Bennett pulled the book from the shelf. They looked it over for any signs of a new message. Seeing nothing on the outside of the book, Daniel told Bennett to open up to the table of contents, just like before. Scanning this page, they searched for the familiar penciled handwriting. This time, they found no words. However, they did notice one chapter title underlined in pencil. The title was called "Andrea Del Sarto."

"Del Sarto was the name of the principal of Granville when my grandfather worked here," Daniel said.

"So, go to that chapter," Yuri urged.

"Okay, okay," Bennett whispered as he flipped the pages. At the beginning of the "Del Sarto" chapter, the boys once again saw the neat, small handwriting in the margin. The short note read, *Look above your father's name. The answer lies there.*

"What do you think that means?" Yuri asked, looking over Daniel's shoulder.

"Well, my Dad's name is Virgil," Daniel answered, now convinced that these messages were directed at him.

"Hey, we just talked about Virgil in class last month. He wrote a long, famous poem called 'The Aeneid.' It's all about the founding of Rome by some guy named Aeneas," Bennett said.

"Okay, let's find 'The Aeneid,'" Daniel said.



Virgil Reveals A Secret

A few minutes later, they found Virgil's "The Aeneid" and excitedly pulled the book from the shelf. As before, they looked at the table of contents for new messages. This time, however, they saw nothing. Daniel scanned through the first pages of the book without finding anything. After several minutes of useless searching, all three of them slumped down on the carpet between the tall shelves.

"This can't be right," Yuri complained. "We can't have followed all those messages to run into a **dead end** like this."

"Yuri, didn't you write down the last message?" Daniel asked.

"Yes, here it is," Yuri answered, pulling a scrap of paper out of his pocket.

Daniel reread the message, and a smile broke across his face. "We didn't read the message closely enough," Daniel said. "It told us the answer is *above* my father's name."



Bennett reached into the shelves where the book had sat. He closed his eyes as he felt along the bottom of the shelf that sat just above "The Aeneid." His hand stopped, he opened his eyes and smiled at Yuri and Daniel. Then he pulled down a dark brown envelope that had been glued to the underside of the shelf. Written in the handwriting of all the other messages was one word: "Daniel."

Yuri and Bennett watched as Daniel, with trembling fingers, opened the envelope. Inside was a letter:

Daniel, my boy, if you are reading this, then you have solved the mystery of Granville library, probably with help from Yuri and Bennett—I am so proud of you. The clues were not easy to follow; only students who think carefully, love language, and notice the tiniest details would be able to arrive at this point. Boys, I watched your love of reading grow from when you were very small. I placed these clues, knowing that if your love of reading continued to grow you would unlock the secret. To discover the great prize that awaits you, find Mr. Slovak, the custodian, and simply say, "We seek the heart of Granville." Say it exactly this way, and he will show you the rest.

*Love,
Grandpa*

The Heart of Granville

The boys found themselves following Mr. Slovak through long corridors crammed with cleaning supplies, broken desks, and surplus library shelves. At the end of the corridor they entered a crowded, dusty, unlocked storage room. It was dark and packed with library shelves and stacks of books. Mr. Slovak stopped at a large bookshelf against the back wall and faced the boys.

"Here it is," he said. "Everything else you'll find inside. And, of course, we'll never say one word of this to anyone else." He then pulled the shelf away from the wall.

The boys crowded around and noticed a small heart painted in dark red on the wall behind the shelf. Mr. Slovak pressed on the heart, and the boys heard a clicking of a lock. Immediately the outlines of a small door appeared in the wall. Daniel, Yuri, and Bennett looked at each other with nervous smiles. "Mr. Slovak, should we . . .," but before they could finish, he vanished.

"Well, here we go," Daniel whispered, as he pressed on the secret door.

The door opened up to a large room sunken several feet below them, at the foot of wide wooden stairs. It was the room of their dreams: Huge, overstuffed red velvet couches and chairs were scattered around, chessboards and checkers boards made of polished wood and ivory sat on dark wood tables throughout. A full suit of armor from a medieval knight stood staring at them from the corner. A Siamese cat leaped down off of one of the sofas and began purring. Old maps of Africa and Asia were framed on the walls. Bookshelves lined the room, but these were not like the ordinary bookshelves above in the library. All of these books were leather-bound works from **decades** ago, names the boys had never heard of. But something about the titles promised exciting mysteries and great adventures.

Sitting on the table in the center of the room, Daniel noticed a large, leather book. In red letters on the cover was the word "Welcome."





They walked over, opened it up, and read the message inside:

Greetings Friends,

Welcome to the secret reading room. You share a great privilege with the wisest students of Granville. When the Granville School was first built in 1880, the founder, Weston Granville, had this room added as a secret reading room for only the most observant students who loved reading. He decreed that to gain access a student had to solve a series of clues planted by a Granville teacher.

Whenever a teacher finds a student who loves reading, they create a pathway of complex clues. You are here because a teacher at Granville saw promise in you, and you succeeded.

This room is yours to enjoy for as long as you stay at Granville. But know this: you must keep the secret. If you tell anyone about the room, it will be shut forever. Mr. Granville demanded this in the will of the school. Only those who earn the privilege of the secret room may enjoy it.

So, congratulations! You have solved the Mystery of Granville Library.



Glossary

acrostics	a group of words in which certain letters in each line or word, when taken in order, spell out other words (p. 7)
binding	the cover or fastenings of a book (p. 6)
catalog	a list of names, titles, or other items arranged in a system, usually in a book, computer database, or magazine (p. 14)
copyright	the legal right to publish and sell a work, usually indicated by a date when the right was granted (p. 6)
dead end	an end with no way out (p. 17)
decades	periods of 10 years (p. 20)
discovered	to have found or seen for the first time (p. 4)
Middle Ages	a period of European history spanning 1,000 years, between A.D. 500–1500 (p. 14)
mysteries	things that are not explained, or are beyond understanding (p. 4)
pattern	lines, forms, or figures used in a predictable arrangement (p. 7)
riddle	a puzzle or question to be solved (p. 11)
scanning	looking over quickly (p. 14)
secrets	things kept hidden from others (p. 4)
treasure	something valuable or prized (p. 6)

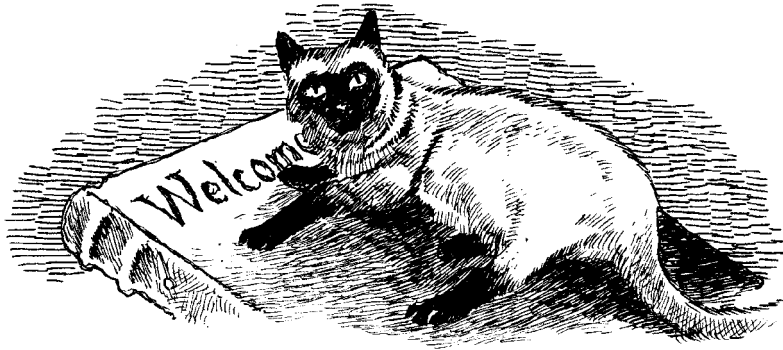
Name _____

INSTRUCTIONS: Choose from the following chapters: "Getting to the Root of the Matter," "Who Is Pater?," or "Virgil Reveals a Secret." Use the problem-solving sequence chart below to show how Daniel, Bennett, and Yuri move to the next clue.

Chapter:
State the problem:
Information needed:
Ideas for solving the problem:
Solution:

Name _____

INSTRUCTIONS: Complete each sentence from *The Mystery of Granville Library* with a simile. Then write a simile of your own that relates to the book.



1. The book was as old as _____.

2. Mrs. Montoya enforced the rules like a _____.

3. _____ were like the Three Musketeers.

4. They tiptoed through the book stacks _____.

5. The library's book catalog found the title as quickly as _____.

6. His eyes scanned the shelves _____.

7. Mr. Slovak disappeared _____.

8. Daniel's grandfather was a mysterious man like _____.

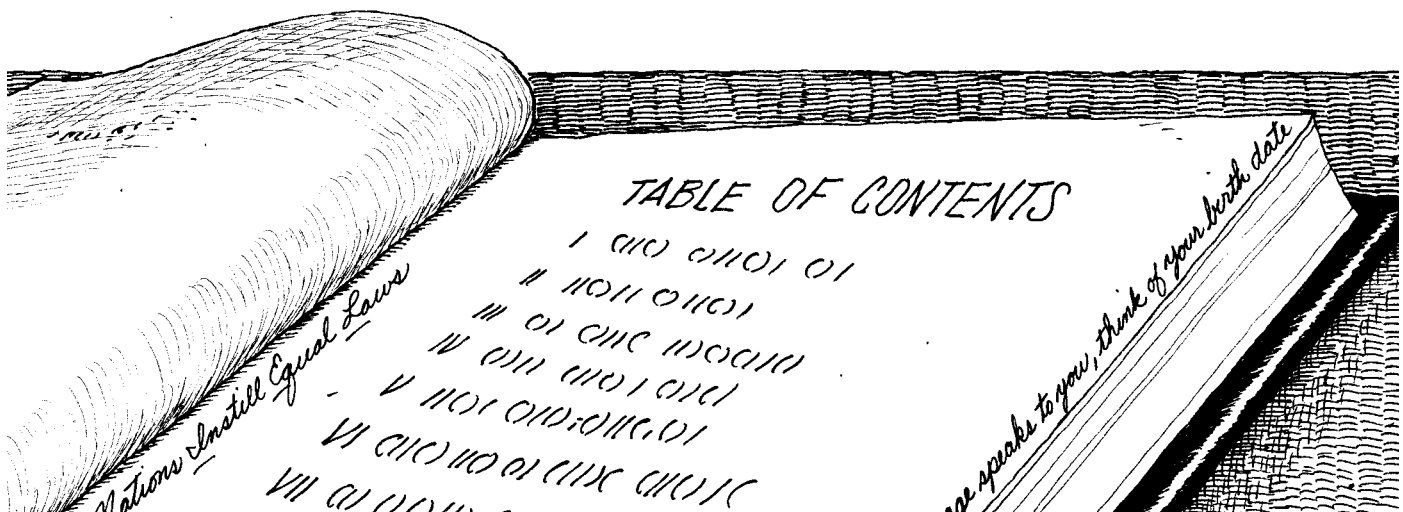
9. My simile: _____

_____.

Name _____

INSTRUCTIONS: Read the clue and write a word that answers it. Put the first letter of your answer in the appropriate box to form a word. You may need to change your answer to create the correct word.

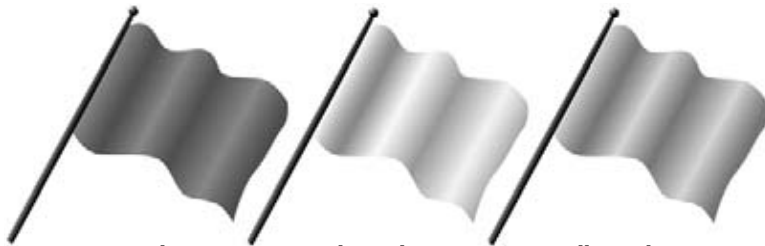
- | | | | |
|----|---|--------|--------------------------------|
| 1. | <div style="border: 1px solid black; padding: 5px; display: inline-block; font-size: 2em; font-weight: bold;">M</div> | essage | A written note or clue |
| 2. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | One of Daniel's friends |
| 3. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | Things kept hidden from others |
| 4. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | Something valuable or prized |
| 5. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | The same treatment |
| 6. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | A puzzle to solve |
| 7. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | A Romance language |
| 8. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | The day when Daniel was born |
| 9. | <div style="border: 1px solid black; width: 40px; height: 40px; display: flex; align-items: center; justify-content: center;"> </div> | | The custodian's name |



The World of NASCAR

A Reading A-Z Level W Leveled Reader

Word Count: 1,214



Green Flag

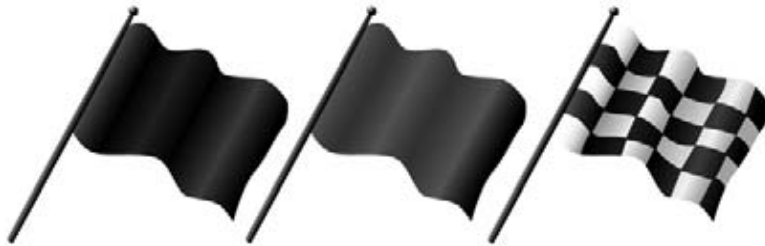
Go

White Flag

1 lap left
in the race

Yellow Flag

Slow or Caution



Black Flag

Enter pits
immediately

Red Flag

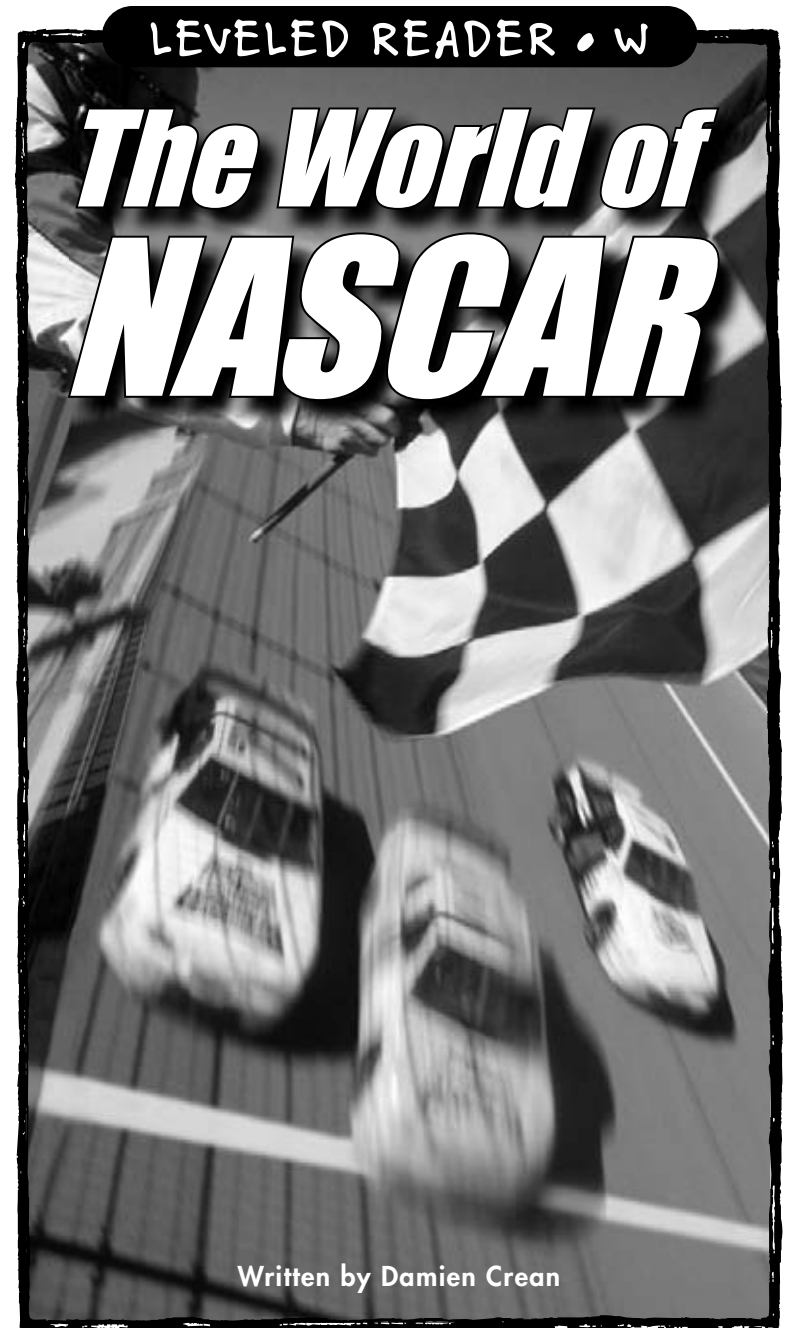
Stop,
track unsafe

Checkered Flag

Finish,
race over


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The World of NASCAR



Written by Damien Crean

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Level W Leveled Reader
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Correlation

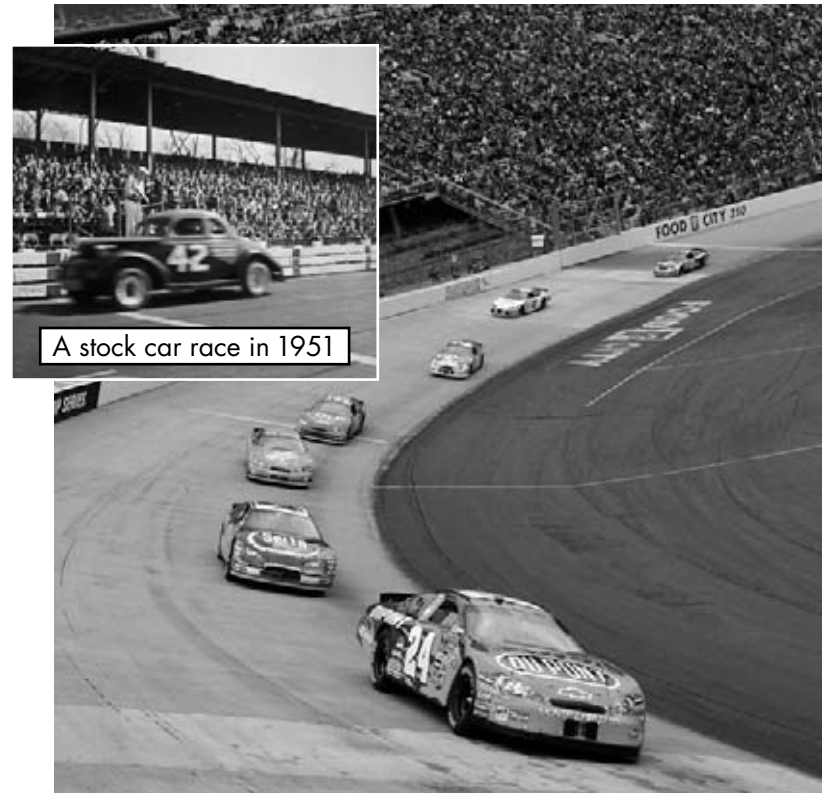
LEVEL W

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❏❏❏❏❏❏❏❏❏ **Table of Contents** ❏❏❏❏❏❏❏❏❏

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A NASCAR race at Bristol Motor Speedway

❏❏❏❏❏❏❏❏❏ **Start Your Engines** ❏❏❏❏❏❏❏❏❏

ZOOM! The cars race by at speeds of over 200 miles per hour. When racing in **NASCAR** (National Association for Stock Car Racing) began in the 1940s, drivers raced regular road cars, also called **stock cars**, around dirt tracks. Since then, NASCAR racing has evolved into a major competitive event involving superior, custom-built cars.

A modern NASCAR car has four wheels, windows, an engine, and a driver's seat, but that's just about where its similarities to a normal road car end. Each **component** of a NASCAR car is engineered to enable it to travel at fast speeds, withstand the punishment of racing, and ensure the safety of the driver.



A modern NASCAR racecar (above) and its interior (below)



Gear for the drivers and cars keep races safer.

NASCAR racing events occur all around the United States. Tracks vary in shape with lengths of less than a mile to as long as three miles. A NASCAR race may cover from 250 to 500 miles. Besides moving in continual loops at speeds in excess of 200 mph, the cars race just inches from their rivals. As a result, a car's strength, durability, and speed are essential to its success.

Each part of a NASCAR car is finely tuned to make it a top-performing vehicle. A careful balance has to be made between driver safety and speed. Strength is needed for safety, and lighter materials are constantly being invented to improve the cars.

Safety First

The inside of a NASCAR car can reach temperatures of up to 150 degrees Fahrenheit (65°C). Many materials invented by NASA for space travel protect NASCAR drivers from extreme temperatures.

Driving suits: contain vents that allow cool, dry air to replace hot, humid air near the driver's skin; cool temperature inside suit by 24 degrees

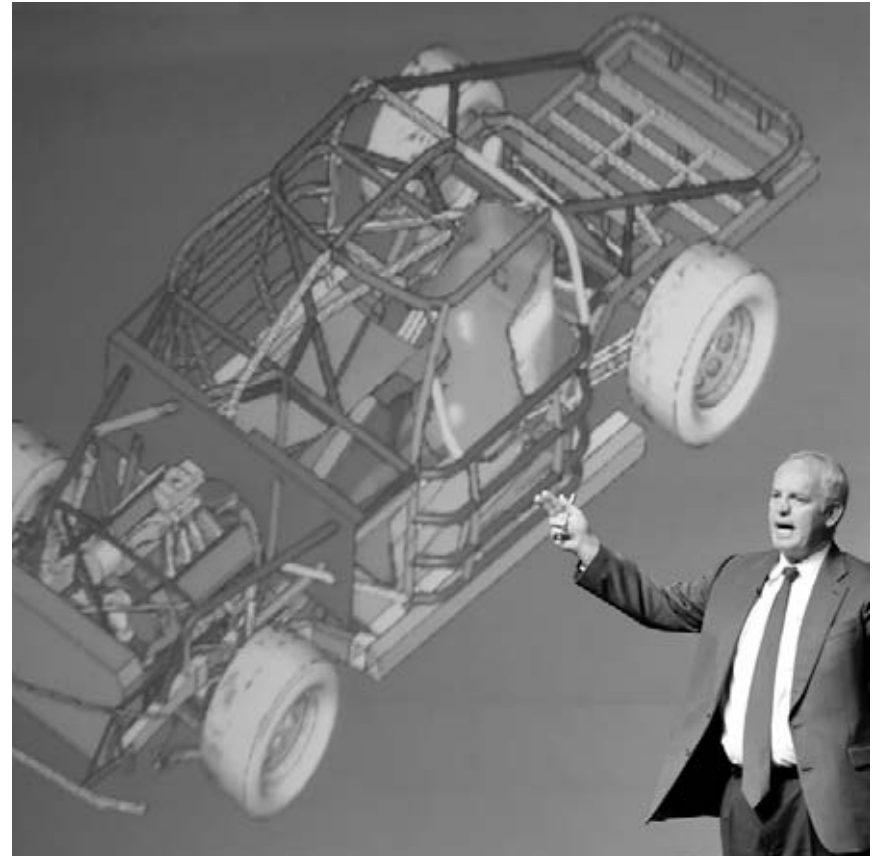
Thermal-protection blankets: protect cockpit of racecar from heat created by engine, exhaust, and transmission; lower temperature in racecar by 40 degrees

Kevlar and Nomex: materials used to insulate and reflect heat; made into fireproof clothing (including gloves, socks, and underwear)



NASCAR helmet and the Hans device, which protects a driver's neck in a crash

Source: NASAExplores.com



Gary Nelson, NASCAR Vice President of Research and Development, addresses the media in 2006.

❖❖❖ Parts Leading to Victory Lane ❖❖❖

Each year, NASCAR racing teams and car manufacturers introduce techniques to push performance boundaries. Race teams invest millions of dollars in wind tunnel testing, engine design, and car development to find the small advantages that can lead to the championship.

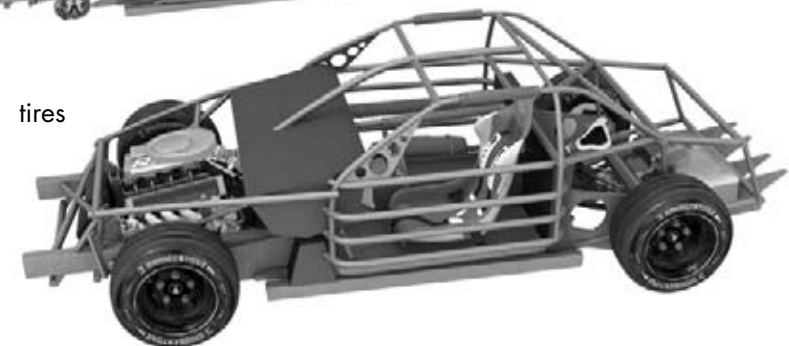
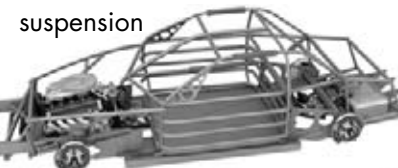
Did you know that each NASCAR team builds a fresh car for each race? This process can take weeks. First, the frame, engine, and body are completed. Then, the team installs the electronics, steering, and the driver's seat—and the car is almost ready. The team then tests the car, dismantles and checks it, and rebuilds it in time for the day of the race.



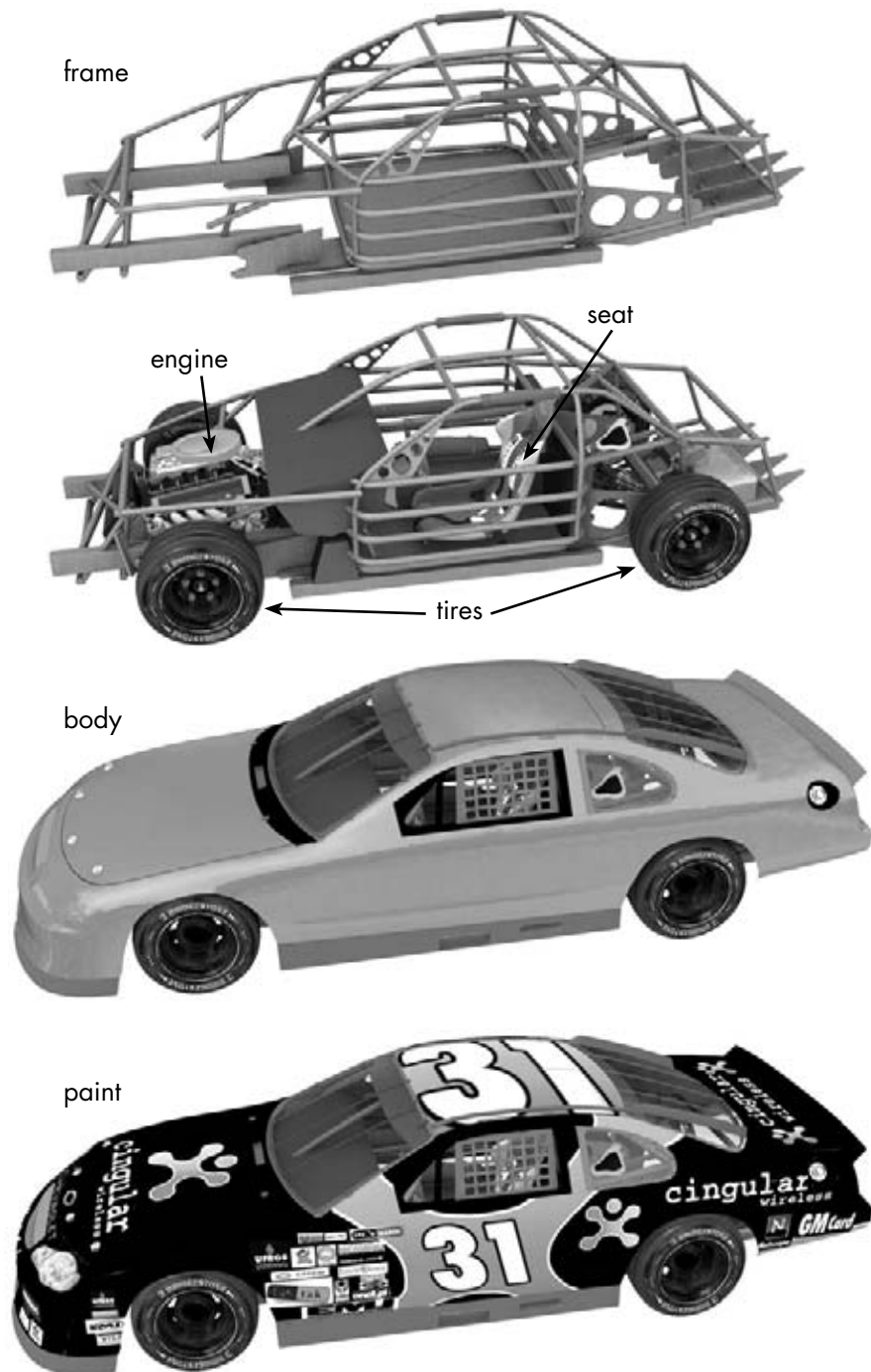
Crews work on their drivers' cars in the garage at Daytona International Speedway.

Designed and built by teams of highly skilled engineers and mechanics, a NASCAR car is made up of four major components: the frame, the engine, the body, and the tires.

The frame, also called the **chassis** (CHAH-see), has two main functions: to protect the driver and to form the main structure of the car. The roll cage, made from thick, rolled steel tubing, is the part of the frame that protects the driver.



The rest of the frame is made using thin, rolled steel tubing so that it crumples during a crash or on impact with a wall. Its purpose is to hold together the engine, body, and wheel **axle**, which are all attached to it.



NASCAR driver Jeff Burton on a practice lap at Daytona International Speedway in Daytona Beach, Florida

Two fabricators put together the body of a NASCAR car by welding thin, rolled pieces of sheet metal. The body shape is primed, or prepared for painting, and then the car is sanded down and given the colors of its **sponsor**. It is also covered with the sponsor **logo**, the car number, the team name, and several advertiser decals.

❏❏❏ ***Pulling Ahead of the Pack*** ❏❏❏

Designers give NASCAR cars a shape that resembles regular road cars. These cars are also designed to suit different track conditions, car speeds, and changing **aerodynamics**, or how air flows around the car. The shape also fits within strict regulations from NASCAR, which gives each design team a template, or model, to make sure they stay within rules for height, width, shape, and aerodynamics.

The 2006 Dodge Charger production car

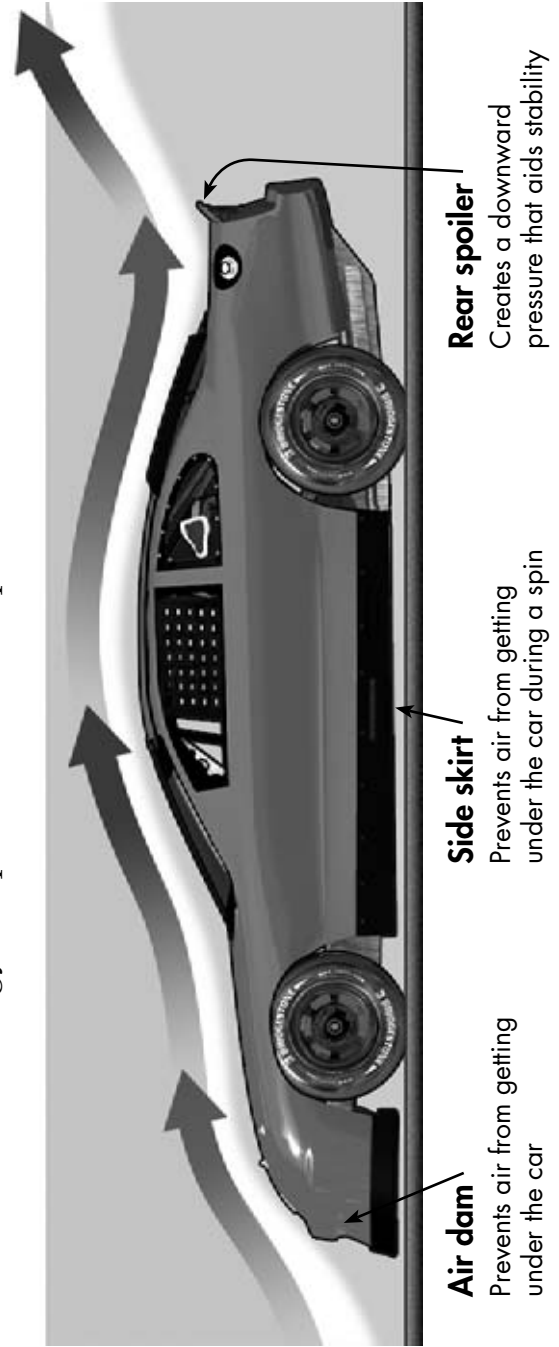


The Dodge Charger, redesigned for NASCAR racing



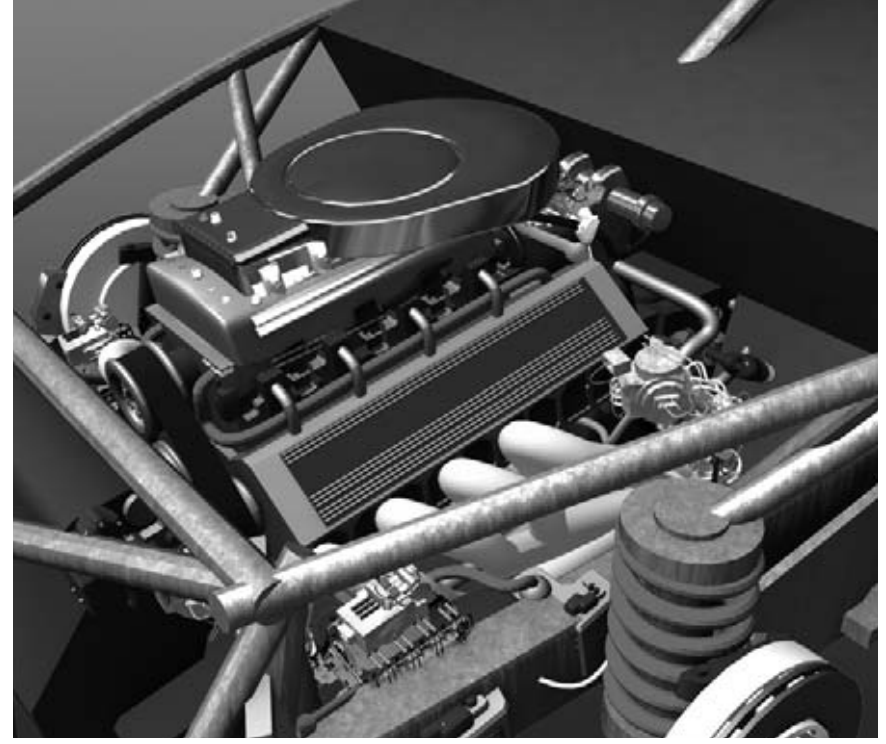
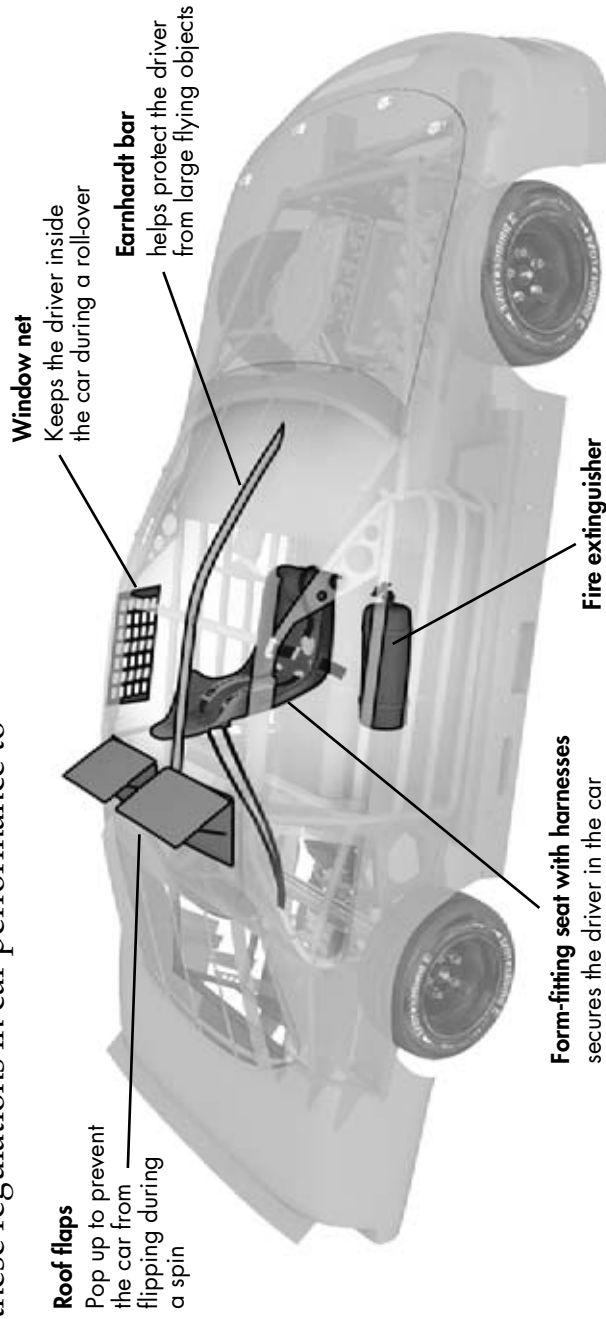
Aerodynamics is an important consideration in NASCAR racing. Aerodynamics is the way air flows around a car and increases or decreases **downforce**, or the energy that pushes the

car onto the track. By increasing downforce, a car has more grip, which helps it maneuver around corners, but it also has more **drag**, which robs the car of speed.



NASCAR determines the amount of downforce a car must have based on the type of track or race series. NASCAR has these regulations in car performance to

ensure that the racing is exciting for the fans, safe for the drivers, and competitive for the racing teams.



The typical look of a NASCAR engine as it sits in a car's chassis

❏❏❏❏❏ *Under the Hood* ❏❏❏❏❏

A NASCAR engine is extremely powerful—it is a V8 engine (an engine with 8 **cylinders** in a “V” shape) that measures 5.4 liters (358 cubic inches) in size. It can produce up to 800 brake horsepower (**bhp**). By comparison, the average road car produces 150 bhp. The NASCAR engine sits under a hood in the front of the car, as in most road cars, in keeping with the stock car theme of the NASCAR car.

As in its design regulations for the car body, NASCAR also regulates engine performance. For some races, restrictor plates are placed in the engine to reduce the amount of horsepower the engine can produce. **Turbo** and **fuel injection** systems are not allowed in NASCAR.



NASCAR official George Metrick examines a restrictor plate during a pre-race inspection at Talladega Superspeedway, where the plates are required by NASCAR.



A Dodge Charger engine

At the core of a NASCAR engine is a cast-iron block, not unlike those of engines that have been used for decades. Technology and modifications, however, have dramatically improved the performance of the modern NASCAR engine.

The NASCAR engine is highly tested and finely tuned. It is able to operate at 200 mph for more than three hours. The engine has to keep maximum output and run efficiently and reliably. Many new and radical elements are used in these engines, and these developments may be included in road cars within a few short years.



Mechanics prepare a Dodge Intrepid engine for installation.

Burning Rubber, Literally

NASCAR tires are made of several layers of rubber, fabric, and steel belts to increase strength. The tires are engineered to tolerate extreme speeds and temperatures. They have to be incredibly strong to prevent the risk of a tire blowout.

NASCAR tires are unlike road car tires in that they are not filled with air. Instead, they are filled with **nitrogen** because air expands under extreme temperatures, which changes the air pressure and makes tires unstable. Nitrogen is able to better withstand the extreme conditions of a NASCAR race and maintain tire pressure and performance.



A newly mounted NASCAR tire at California Speedway



A shredded NASCAR tire at Daytona International Speedway



A wheel-mounted race tire



A cutaway view of the race tire showing its interior

NASCAR tires are made to stick to the track, enabling the car to corner at very high speeds. The combination of track shape, downforce, and sheer speed places a NASCAR tire under extreme stress in a race. Each tire only lasts for about 150 miles. Since speed is essential in NASCAR racing, all four tires need to be replaced while a car is in a pit stop. This can be done in less than 15 seconds.



NASCAR driver Jeff Burton during a pit stop at Daytona International Speedway



The checkered flag signals that a winner has crossed the finish line.

❖❖❖❖❖ *Checkered Flag* ❖❖❖❖❖

Car designers are constantly looking for ways to alter a car's aerodynamics to help with its cornering or to increase its speed.

Today, NASCAR cars move at incredible speeds on an asphalt track, but cars in the future of NASCAR may actually hover above the track. One thing is certain, we will always be fascinated with speed and the vehicles that can get somewhere the fastest.

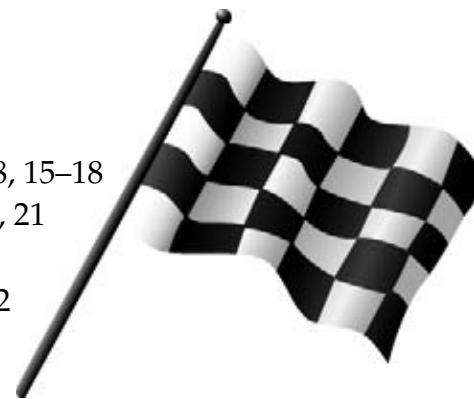
Glossary

aerodynamics	the study of how air moves around the shape of an object (p. 13)
axle	a steel bar between the left and right wheels (p. 10)
bhp	stands for brake horsepower; measures the full power the engine has for high performance (p. 16)
chassis	the car frame that holds the car together and protects the driver (p. 10)
component	a part that combines and works together with other parts (p. 5)
cylinders	the tubes in the engine where fuel is compressed and ignited (p. 16)
downforce	the force of air that pushes a car down and helps keep it on the track (p. 14)
drag	the force of air that holds a car back as it travels (p. 14)
fuel injection	a system that delivers fuel more directly to the cylinders (p. 17)
logo	a small design that represents a company and/or a product (p. 12)

NASCAR	National Association for Stock Car Auto Racing; a racing organization and the events it organizes (p. 4)
nitrogen	a pure natural gas used in racing tires (p. 20)
sponsor	a company that contributes money to the racing team for advertising stock cars (p. 12)
stock cars	regular cars such as those used on city streets (p. 4)
turbo	an enclosed turbine, or fan, that increases engine horsepower (p. 17)

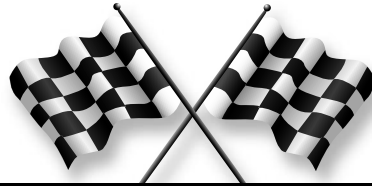
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Name _____

Instructions: In the first box, write what you're curious about. In the second box, write answers to any of the questions in the first box. In the third box, write questions you still have about the topic.



What I'm curious about

Answers to my questions

What I still want to know

Name _____

Instructions: Use the book to identify the causes or effects for the information in the chart.

Cause	Effect
1. NASCAR cars travel at high speeds and must ensure the safety of the driver.	1.
2.	2. A NASCAR race may cover from 250–500 miles.
3. Race teams invest millions of dollars in wind tunnel tests, engine design, and car development.	3.
4.	4. NASCAR gives each design team a template for a car.
5. A NASCAR car has a V8 engine.	5.
6.	6. NASCAR tires are made of several layers of rubber, fabric, and steel belts.

Name _____

Instructions: Use each list of items in a sentence. Write the sentence on the line below the items.

1. pencil paper crayons

2. shirt pants socks

3. zebras bears lions giraffes

4. carrots juice crackers tuna

5. basketball soccer football



Name _____

Instructions: Define each base word using a dictionary. Then fill in the blank in each sentence by adding a prefix or suffix to a base word. Use the definitions of the base words and context clues to choose the correct word for each blank.

build: _____

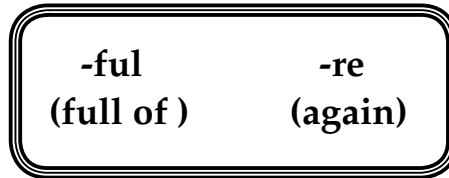
design: _____

paint: _____

power: _____

skill: _____

success: _____



1. NASCAR cars have extremely _____ engines.
2. Each NASCAR team will _____ a fresh car for each race.
3. The _____ drivers race at speeds of over 200 miles per hour.
4. Race teams invest lots of money to create a _____ car.
5. They had to _____ the car to match the colors of the sponsor.
6. The team will _____ the car to make it pass new regulations.

Joe Kittinger: An Unsung Hero

A Reading A-Z Level W Leveled Reader

Word Count: 1,626



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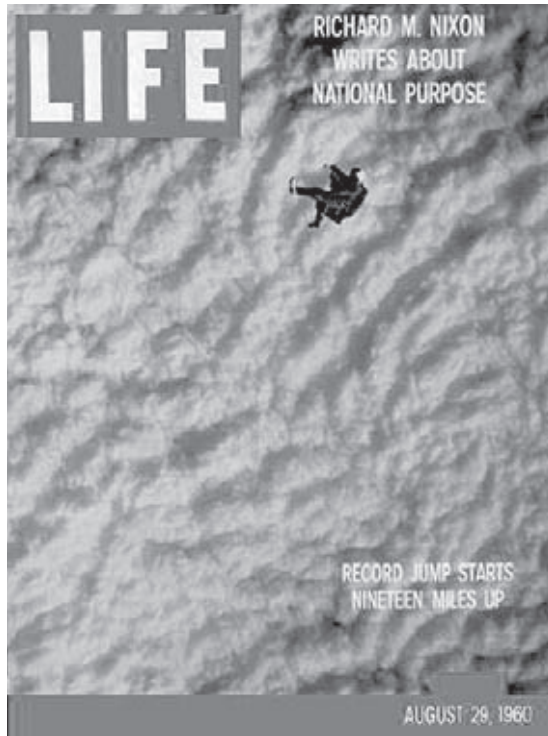


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Yuri Gagarin



Neil Armstrong



Alan Shepard

Introduction



John Glenn



Sally Ride

Space exploration has many heroes. If you were asked to name a few, you might mention Yuri Gagarin, the first person to travel into space, or Neil Armstrong, the first person to walk on the moon. Or you might name Alan Shepard, John Glenn, or Sally Ride, all well-known American astronauts. But you probably would not include Joe Kittinger on your list. He is an unsung hero. However, many people regard Joe as a true pioneer of space exploration.

Joe Kittinger was neither an ordinary space explorer nor an actual astronaut or **cosmonaut**. However, what Joe did probably took more courage than that of any astronaut who climbed into a space shuttle or capsule and rocketed into space. What did Joe do that was so extraordinary? Let's find out.



Jumping Joe

Before humans were zooming into space in rocket-propelled capsules, Joe Kittinger was flying high-altitude balloons into the very edge of space. It was all part of a U.S. Air Force project called *Project Man High*. The project's purpose was to test what would happen to humans who spent a long time in conditions similar to those found in outer space. In June 1957, Joe made his first balloon flight into the **stratosphere** and reached an **altitude** of 29,000 meters (96,000 ft). He was aloft for almost seven hours. The information gathered from high-altitude balloon flights by Joe and others was **invaluable** to NASA's planning for the first human space flights.

Later, Joe was the engineer for *Project Excelsior*, a U.S. Air Force project to develop safe ways to escape from high-altitude aircraft and spaceships. In August 1960, a year before Russian cosmonaut Yuri Gagarin became the first person considered to travel into space, Joe Kittinger accomplished an equally incredible feat. He rode in a balloon filled with helium gas to a distance of 31,333 meters (102,800 ft) above Earth. A typical passenger jet flies at about 9,144 meters (30,000 ft) above Earth. Joe went more than three times higher than passenger jets fly—in a balloon!



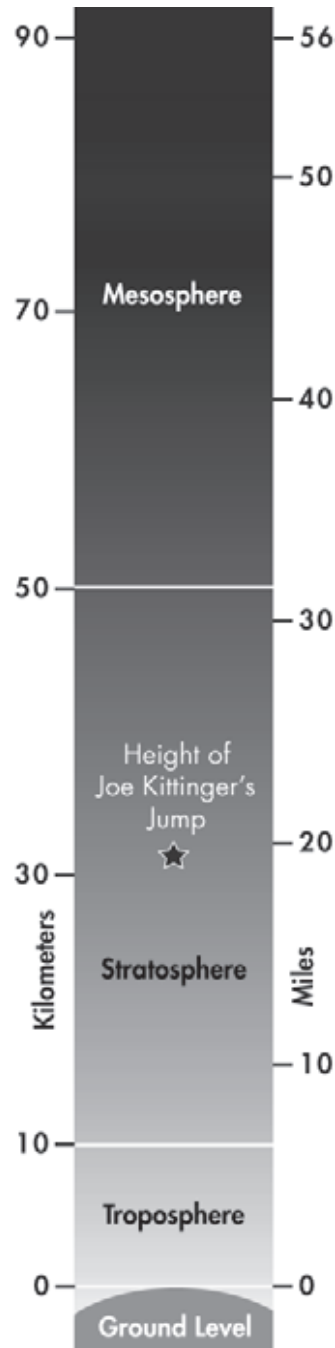
Okay, so that's pretty incredible, isn't it? But get this—next, Joe stepped out of the balloon! At 31,333 meters (102,800 ft) above Earth, he stepped out of the open **gondola** into the emptiness of space. He wasn't going for a space walk. Instead, he jumped out and began falling back to Earth.



Do You Know?

Joe piloted 62 different types of aircraft that included planes and balloons. He flew 5,300 hours in jet-plane flight and about 1,000 hours flying combat missions. He parachuted 100 times, with five of those jumps from balloons at very high altitude.

Before we learn what happened to Joe, let's think about conditions at 31,333 meters (102,800 ft) above Earth. At that altitude, the air is very thin, which makes it next to impossible to inhale enough oxygen with each breath. Joe carried a supply of oxygen, which allowed him to breathe comfortably. However, it is also incredibly cold that high above Earth. At the 32-kilometer (20-mi) distance Joe traveled in his balloon, he was deep into a layer of the atmosphere called the stratosphere. This layer stretches from 9.5 to 48 kilometers (about 6–30 miles) above Earth. So Joe was floating well into the stratosphere, where temperatures can be as low as -68 degrees Celsius (-90°F).



To keep himself warm in these **hostile** conditions, Joe wore several layers of clothing. He also needed to wear a special pressurized suit to prevent his body from exploding and his blood from boiling. The danger of this happening was



Joe, enters the balloon gondola in a pressurized suit.

caused by the low-pressure conditions of space, where very little air exists. In space, pressure inside the body is much greater than the pressure from the outside atmosphere, which pushes against the body. This can happen starting

at an altitude of 18,900 meters (62,000 ft), which is known as the Armstrong Line. Despite all the measures taken to keep Joe safe, he experienced pain in his right hand when the pressurized glove he wore developed a leak and lost pressure.

Math Minute

When Joe jumped from his high-altitude balloon at 31,000 meters, he was in a free fall for 4 minutes and 30 seconds before his parachute opened. He was at 5,500 meters when the chute opened. What was his average speed in meters per second during his free fall?

Answer: about 95 meters per second

Let's continue to follow Joe in his amazing fall through the atmosphere. He was being pulled by gravity back home to Earth. As he fell, his body **accelerated**, reaching speeds of over 965 kilometers (600 mi) per hour. Some experts say he even may have broken the sound barrier. If so, he would be the only person ever to break the sound barrier unaided or unprotected by any sort of craft.

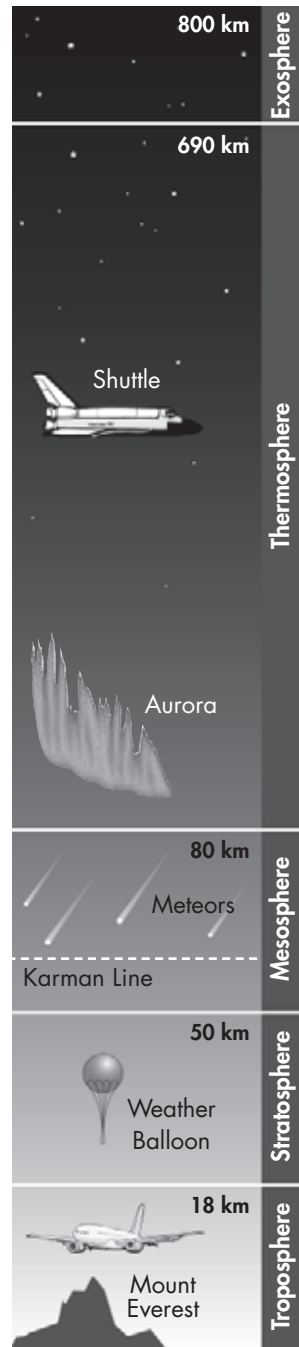


After falling for 16 seconds, Joe's small, 1.8-meter (6-foot) diameter drogue parachute opened and slowed his fall. A drogue parachute is **elongated** and thinner than a regular parachute. This design stops the parachute from being torn apart during high-speed falls from high altitudes. Joe floated for another 4 minutes and 36 seconds before his main parachute opened, allowing him to drift slowly down to Earth. Joe had proven that a human could survive in near space-like conditions outside a spacecraft or aircraft after an emergency escape.

You might ask whether Joe was really in space—technically speaking, he was not. Space really does not have a well-defined border. It's not like stepping across the border of one country into another.

The atmosphere just keeps getting thinner and thinner as you move away from Earth.

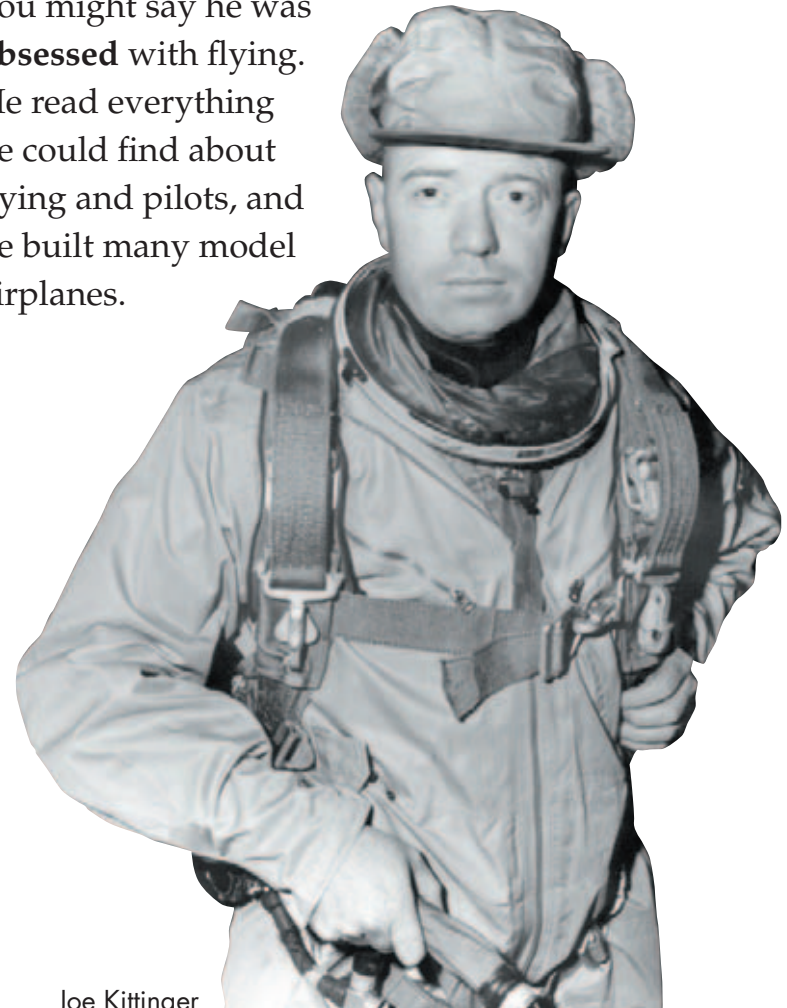
However, many scientists define the border of space—called the Karman Line—as 100 kilometers (62 mi) above Earth. So it would appear that Joe didn't actually reach true outer space. Nonetheless, he was high enough to experience conditions similar to those in space. And remember, he wasn't even inside a spaceship. Joe's daring jump set an altitude record for a parachute jump that remains unbroken but not unchallenged. Others are preparing attempts to break his record.



Joe Sets Another Record

Joe was more than a guy who jumped out of balloons. He was also a highly skilled pilot with a love of flying that began early in his life. Born in 1928 in Tampa, Florida, Joe spent his early years growing up around Orlando, Florida.

You might say he was **obsessed** with flying. He read everything he could find about flying and pilots, and he built many model airplanes.

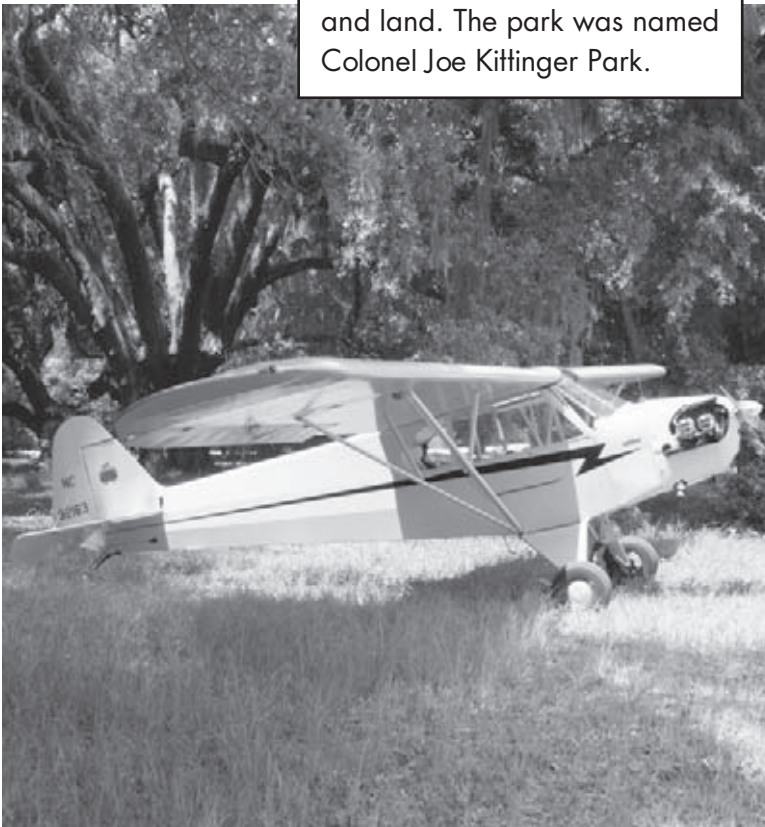


Joe Kittinger

Joe spent his teenage years hanging around a local airport and persuading pilots to give him free plane rides. By age 17, he had flown his first solo flight. Joe joined the U.S. Air Force after two years of college and soon became a test pilot, flying experimental and fighter aircraft.

Do You Know?

The city of Orlando, Florida, built a park by the airport where Joe used to hang out so other kids could have a place to watch planes take off and land. The park was named Colonel Joe Kittinger Park.



Joe dreamed about flying a Piper Cub when he was a teenager.

In 1955, Joe went from piloting airplanes to piloting balloons. He had made several high-altitude balloon flights and balloon jumps before his record-setting flight and jump in



1960. In one of those earlier jumps, Joe's drogue chute opened only 2 seconds after he jumped



from the gondola, instead of after 16 seconds as it was supposed to. A cord from the chute wrapped around his neck and sent him into a near-fatal downward spiral. Joe became unconscious during the violent

spinning. But luckily, his safety chute opened automatically and slowed his fall, allowing him to float safely down to Earth.

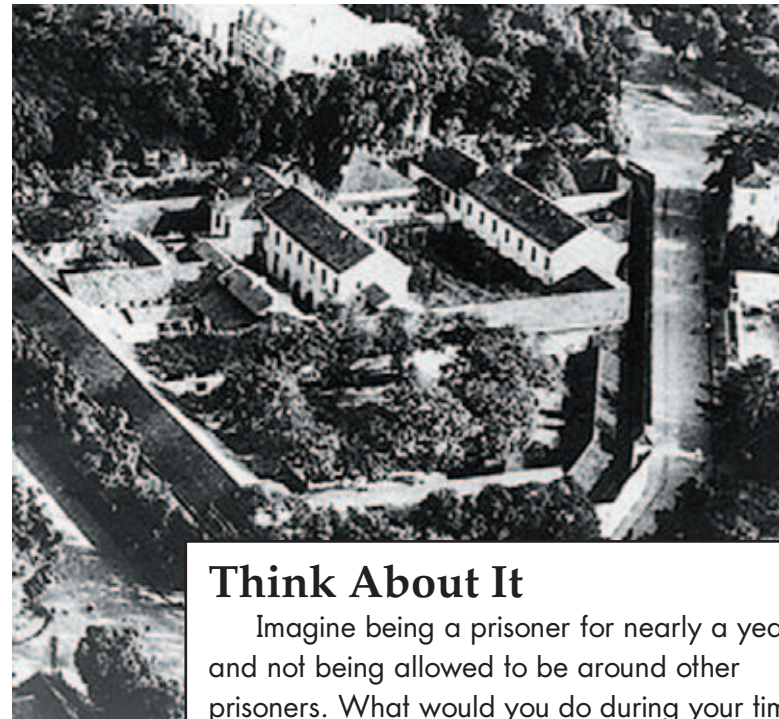
You might think that this experience would have caused Joe to think about changing his career, but it didn't. He stuck with the project and made other flights, which led to his record-setting balloon flight and jump.





Joe posing with his jetfighter

After setting the world record for his high-altitude parachute jump, Joe went to Vietnam and flew combat missions. He served three combat tours during the war and flew a record-breaking 483 flight missions. In 1972, on his 483rd flight, his luck ran out when he was shot down. That became his last flight in combat.



Think About It

Imagine being a prisoner for nearly a year and not being allowed to be around other prisoners. What would you do during your time in confinement to keep your mind occupied?

Joe was able to eject from his crashing jet and parachute safely to Earth. Unfortunately, he landed behind enemy lines, 30 miles northwest of Hanoi, North Vietnam, and was captured immediately. For the next 11 months, Joe was a prisoner of war held by his captors in the infamous “Hanoi Hilton” prison. Joe was placed in **solitary confinement** for 30 days. During his time as a prisoner, Joe occupied his mind by planning every detail of a balloon flight around the world—a flight that no human had accomplished.

More Records for Joe

After retiring from the Air Force in 1978, Joe continued his work in **aeronautics**. He also added to his other record-setting accomplishments by flying lighter-than-air balloons. He entered many competitions around the United States. Five years after his retirement from the Air Force, Joe set yet another record. He flew a helium-filled balloon from Las Vegas, Nevada, to Franklinville, New York—a distance of 3,220 kilometers (2,000 mi). It took him 72 hours to fly the record-setting distance.

Joe flew this balloon from Las Vegas, Nevada, to Franklinville, New York.



In 1984, at the age of 56, Joe decided to go for another record. No one had flown a balloon alone across the Atlantic Ocean—all the more reason for Joe to try it. On September 14, 1984, he took off from the state of Maine and drifted eastward. Almost 84 hours and 5,633 kilometers (3,500 mi) later, he landed his balloon in Italy. Joe had set another record.



Joe with the helium-filled balloon he flew across the Atlantic



Conclusion

The dictionary defines a hero as someone who commits an act of bravery or who shows great courage when undertaking a task. Based on this definition, Joe is certainly a hero. Many heroes in fields like exploration become well known, with their names appearing in the news and in textbooks. Joe Kittinger is not a name that comes to mind in connection with space exploration. In this sense, Joe is an unsung hero. His early work with high-altitude balloons was not undertaken for the purpose of setting records, but rather for the benefit of pilots and astronauts.



Colonel Joe Kittinger, right, with President Eisenhower, center, after receiving the Harmon trophy.

Despite being relatively unknown to the general public, Joe was recognized for his outstanding accomplishments. U.S. President Dwight D. Eisenhower awarded him the Harmon Trophy after Joe set the record for a high-altitude jump. Joe received many other awards and honors for his military, ballooning, and parachuting achievements, including the Silver Star, Distinguished Flying Cross, and Purple Heart. Joe is a man of extraordinary courage and bravery who made important contributions to the field of space exploration.

Glossary

accelerated	increased in speed (p. 11)
aeronautics	the work or study of flight (p. 19)
altitude	the measure of distance above Earth (p. 6)
cosmonaut	a Russian term for a space traveler; synonym for astronaut (p. 5)
elongated	made longer (p. 12)
fatal	resulting in death (p. 16)
gondola	a boat-like enclosure (p. 8)
hostile	unfriendly (p. 10)
invaluable	so helpful that it cannot be priced (p. 6)
obsessed	thought about constantly (p. 14)
solitary confinement	to be kept in prison alone, with no interaction with other people allowed (p. 18)
stratosphere	a layer of the sky that is between 9.5 and 48 kilometers (6–30 miles) above Earth's surface (p. 6)

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Name _____

Instructions: In the first box, write what you already know about *Joe Kittinger*. In the second box, write what you would like to learn about him. After you finish reading, fill in the third box with information you learned from reading the book and the fourth box with what you still want to know.

What I know
What I want to know
What I learned
What I still want to know

Name _____

Instructions: Write a vocabulary word in each *Word Box*. Write a definition for each word in the appropriate boxes. Then use each word in a sentence.

①

Word Box

Definition

Sentence

②

Word Box

Definition

Sentence

③

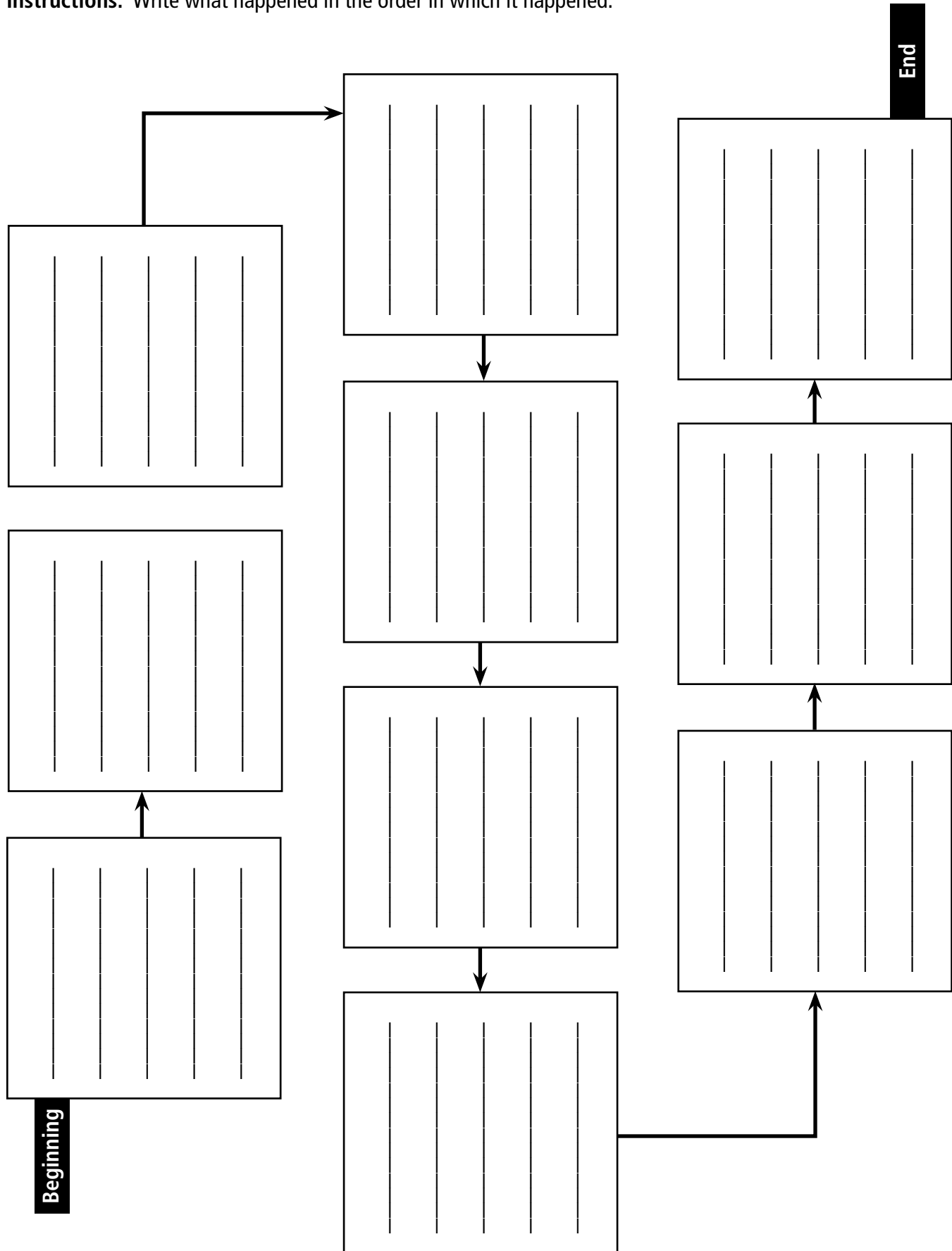
Word Box

Definition

Sentence

Name _____

Instructions: Write what happened in the order in which it happened.



Name _____

Instructions: Circle the compound adjectives in the sentences below. Then underline the noun or nouns that each adjective describes.

1. Joe had proven that a human could survive outside a spacecraft at near space-like conditions.
2. Joe made several high-altitude flights in a balloon.
3. It took him 72 hours to fly the record-setting distance from Nevada to New York.
4. Alan Shepard, John Glenn, and Sally Ride are all well-known American astronauts.
5. Joe joined a project to develop safe ways to escape from high-altitude aircraft.
6. Humans zoomed into space in rocket-propelled capsules.
7. Joe floated for another four and a half minutes before his full-sized parachute opened.
8. Space really does not have a well-defined border.



Miguel in the Secret Garden

A Reading A-Z Level W Leveled Reader

Word Count: 2,190




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Miguel in the Secret Garden



A Great Callardo Book Written by Lori Polydoros
Illustrated by David Cockcroft

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Miguel in the Secret Garden



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Note: The Great Gallardo's Books is a continuing series written by Lori Polydoros. Travel with Miguel Ventura as he experiences a classic adventure inspired by Frances Hodgson Burnett's *The Secret Garden*.

Miguel in the Secret Garden
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Fountas & Pinnell	S
Reading Recovery	26
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Groaning About Gardening

Roses. Oregano. Raspberries. Miguel Ventura was exhausted. The weeds. The thorns. The smells. Working in the family garden was not how he planned to spend his summer.

"We need your help," his dad said, "to grow food for the shop." Miguel and his little sister, Teresa, often lent a hand at the Ventura family sandwich shop.

"Gardens," Miguel's dad glanced up, "can be magic."

"Yeah, right."

"The Earth has healing powers." His dad cut a bouquet of yellow roses. "The peace would do you some good."

"I don't want peace," Miguel said. "I want adventure and danger!"

Dad rolled his eyes.

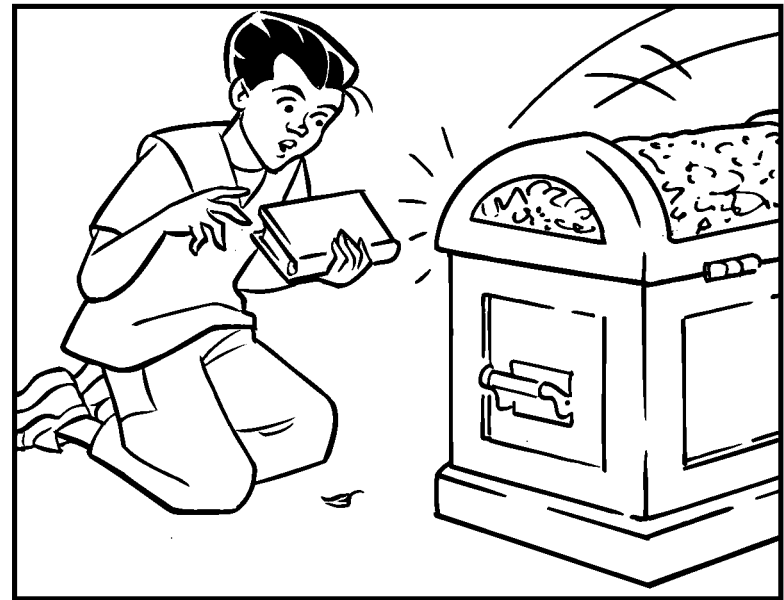




Miguel took a break in the coolness of the shop. Mom and Teresa baked bread, so he sneaked away to the loft. He was in **desperate** need of The Great Gallardo's books. A while back, Miguel had discovered a chest full of magic books that belonged to his great-grandfather George, a magician called The Great Gallardo. Miguel went into these stories as an actual character. He'd become Huckleberry Finn from *The Adventures of Tom Sawyer* and the Scarecrow from *The Wizard of Oz*. Every time Miguel entered a story, he usually had to solve a big problem. Sometimes it was pretty dangerous. And danger was what Miguel needed.

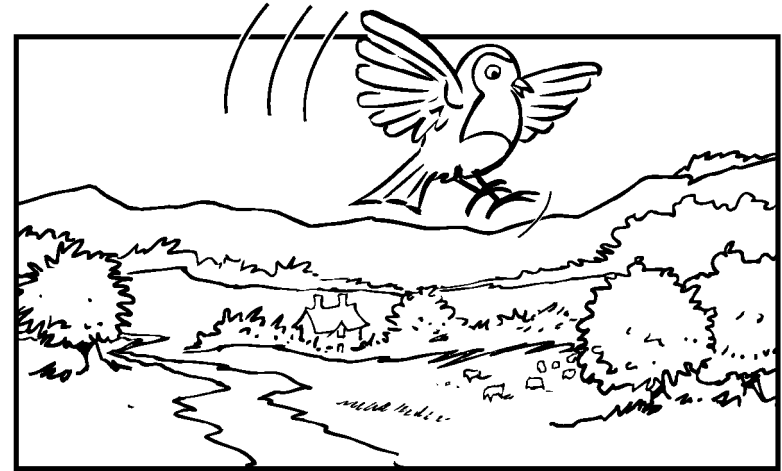
Up at the loft, a red feather rested near the rusty lock of the chest. When Miguel first chose one of The Great Gallardo's books, he usually found a strange object from the story. Miguel spent hours trying to figure out how he became a real, live character in a book. Was it a spell? An enchantment? The Great Gallardo's magic could be risky. Maybe it was a curse.

A colorful book sat atop all the others. He picked it up. *The Secret Garden*. It was a good book he remembered from the beginning of the year, but it wasn't dangerous enough. Miguel tried to choose another. But the lid had closed. The chest was locked!



Once a book had magically been chosen for him, there was no going back, so he opened to page 181. "The robin flew from his swinging spray of ivy . . ." The words scrambled on the page. "... trill on of the and he loud, opened top his an sang beak a wall lovely."

Dizziness swept over Miguel like a wave. He closed his eyes, and a gust of wind swept him up, lifting him high above until he felt weightless—like air. Was he flying?



Bird Talk

Miguel *was* flying! He soared miles and miles above green pasture. With each gust of wind, the air flowed under him, lifting him higher. He rocketed through the air, flapping hard . . . FLAPPING?

Miguel tried to extend his arms but found that he had wings and feathers instead. "I'm the robin!" he said as he began to flap his wings.

Never in any Great Gallardo book had Miguel become an animal. He pointed his beak and dove downward. The ground rushed up at him as though he were fast-forwarding a movie on a screen. With wings spread wide, the wind brushed against him, but the feathers **insulated** him from the cold. Being a bird was incredible!

A big gust of wind rushed through the oak trees and lifted trailing sprays of untrimmed ivy. During the gust, Miguel noticed a wall between the vines. Could this be the secret garden in the book?

Swooping down with the next gust of wind, he saw things in patches, almost as though he were looking at a map, one grid at a time. Details popped out as though they were **three-dimensional**. Miguel zeroed in on a section of the brick wall. He fluttered around and around the ivy, until one more big rush of wind lifted up a thick patch, revealing a round doorknob. It was the entrance to the secret garden!

A small wave of excitement flittered through his feathers, but his first **instinct** about this story soon returned. This was not going to be the exciting adventure he hoped for. He regretted having climbed into the loft.



A whistling sound drew him down and around the garden, where he found a man tending the roses. "That has to be Ben, one of the groundskeepers!"

Miguel fluttered above his head.

"You're at it again, today, robin," Ben said. "Mary is over there!"

Miguel rose on an **updraft** and cruised above the trees again. He caught sight of a young girl searching in the orchard as though she'd lost something. Miguel let a current of air gently lower him to a branch of ivy. "Follow me, Mary!" he squawked at her. "There's something I must show you."



Mary stared at him and cocked her head.

He quickly remembered that robins didn't speak English; his words were only chirps and cheeps. He tried again, but no matter what he said, it came out something like *cheerily, cheer up, cheer up*.

How could he get Mary to understand him? He hopped up and down, flapped his wings, and bobbed his head.

"What a strange bird," Mary said.

Miguel shook his head back and forth. He stood on one foot. To get her attention, Miguel belted out the best bird-song he could **muster**. But as hard as he tried, the song came out sounding like the whispery words *hisselly-hisselly*.

Mary smiled. "Thank you for the song, dear robin, but I'm trying to find a lost garden that was my aunt's favorite place." She skipped away down the path, leaving a most sorrowful bird behind.

This was going to be tougher than he thought. Miguel's frustration was building. How could he talk to her if she didn't speak his language?

A Snack for a Fox

After a little nap in the oaks, Miguel awoke to the grumblings of his stomach. He flittered down onto a rock. A tiny school of fish headed downstream in a creek. *Too fishy for lunch*. A squiggly earthworm squirmed in the mud below him. *Too mushy for a snack*. Miguel sighed. If he didn't find something to eat soon, he'd have no energy to help Mary find the secret garden.

He flew up and away when he noticed a large patch of land lined with rows and rows of vining plants. As he landed in the field, a sweet scent wafted through the air. It was a vineyard full of plump purple grapes—*just right for lunch!* He pecked and pecked away at the fruit, which restored a bit of his body's energy with each morsel he ate.





Amid the feast, Miguel heard a strange sound. It was soft like a flute, but lighter, almost like trees blowing in the breeze. A boy with rosy cheeks walked up to him, flute in hand. "Hello, fair robin." Several squirrels and a small rabbit peeked out of pockets on his worn jacket. A little red fox followed at his heels. This must be Mary's friend Dickon; he had a knack for talking with animals. Surely he could help Miguel.

"I need to find Mary," Miguel chirped.

"Slow down—I don't speak robin very well," Dickon chuckled as he sat down on a stump. The fox hopped up to his lap.

"I need to find a girl named Mary." Miguel tried to speak clearly, but he knew that each word was merely bird chatter. "Mary. Mary. MARY!" His words **spewed** out like a bird alarm, *tuktuk, tuktuk, tuktuk*!

Robin talk was **indecipherable**! Miguel stared at Dickon, willing him to understand his request. But instead, the dark eyes of the fox stared back. Miguel froze, quickly realizing that he was the perfect size for a tasty treat.

"Tell me again, robin," Dickon said.

But before Miguel could utter one little chirp, the fox's eyes narrowed and its ears stood erect. Miguel's heart raced. He had to get out of there—NOW! With a **swivel** of his head, Miguel lifted his wings.

The fox lunged.

"Stop!" cried Dickon.

Miguel glanced back. He flapped his wings but found it difficult to fly in a panic.

He ran forward, but every time he tried to lift off, the fox sped closer.





For a moment, his wings seemed useless, so he hid in a hollow log. A narrow snout shoved its way in. Miguel screeched. Fluttering out the other side, he waddled forward, flapping his wings.

His feet floated off the ground. He flapped. *Pump. Pump. Pump.*

Just as he began to fly, the fox swatted him down.

A pain shot through his body. He hit the ground with a *thud*.

He tried to stand, but his wings felt heavy, as though he wore an iron blanket. The eyes of the fox burned into his. Miguel's eyes fluttered. Then all went dark.

Broken Wing

Miguel awoke to warmth—a cozy feeling that reminded him of being tucked away in his bed at home on a rainy night. He blinked his robin eyes, and soon things became clear. Miguel sat inside a box filled with shredded cloth. He was still alive!

"Don't fret, dear robin." Dickon stroked his wings. "You're safe."

Dickon's house had a fire burning in the hearth, and herbs and dried fruit hung from hooks along the wall. And best of all, there was no fox!

"I do apologize for the impoliteness of my fox," Dickon said. "Sometimes, nature gets the best of him."



Miguel's right wing ached, a constant jabbing pain as though he'd broken his arm. How would he ever take Mary to the garden door if he couldn't even fly?

"I must get Mary to the garden!" Miguel chirped, lifting one wing.

"It's broken," Dickon said. "But I will care for you."

Could Dickon understand him? "I must get to the garden!" he chirped.

Before Dickon could respond, a knock came from the small wooden door. Miguel took in a deep breath as it creaked open.

Mary!

Miguel chirped and hollered and sang a chorus of robin song. He hopped up as best he could with a broken wing and bobbed his head.

"I think he has a message for you!" Dickon ushered Mary over to the robin.

"That strange bird again," she said. "He behaved that way yesterday."

"The door to the garden!" Miguel chattered. "I know where it is!" With all the strength he could find, he hopped out of the box and onto the table.



Ever so carefully, Miguel jumped down to a chair, then onto the floor. Pain flashed through his wing. He waddled over to the door, standing there, staring forward.

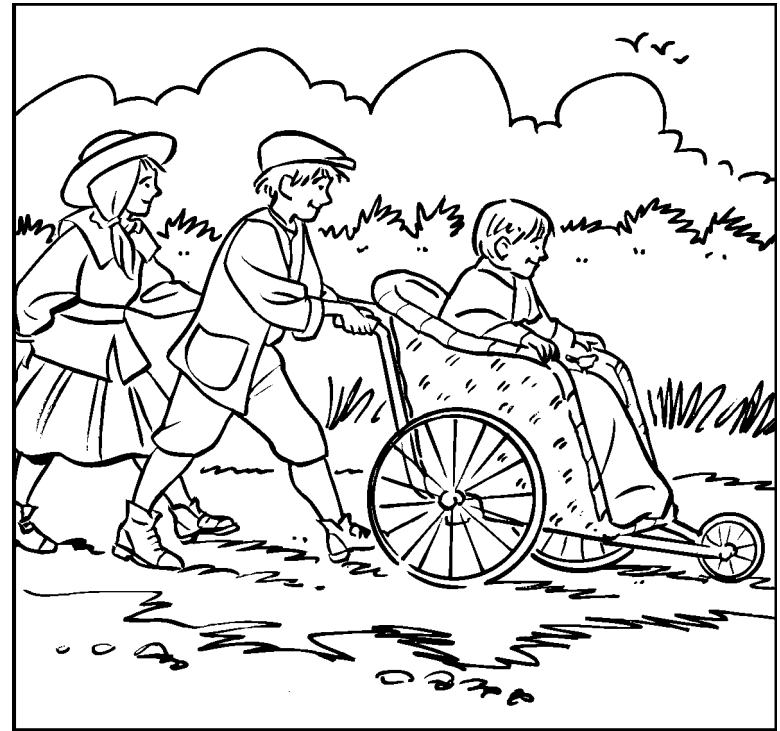
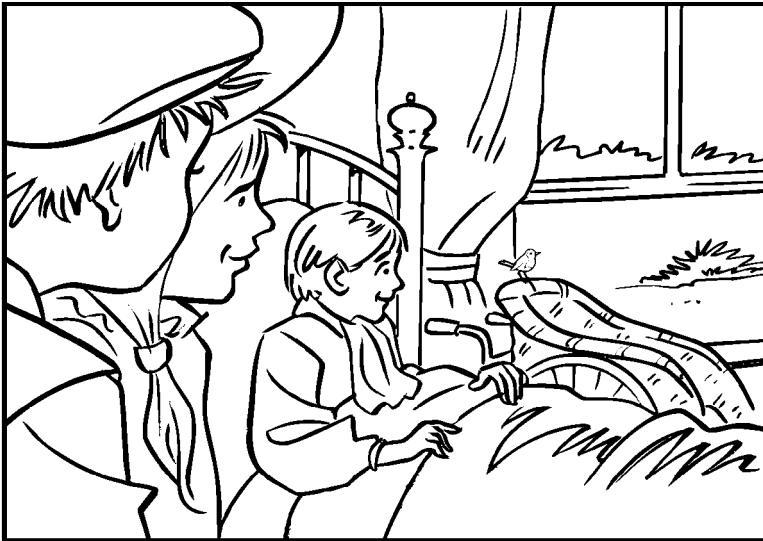
"I think he wants to show us something," Mary said.

"But he can't fly." Dickon scooped him up.

"No, but I've got the perfect idea," Miguel said. "Follow me!"

Tucked away in Dickon's pocket, Miguel led them out of the small house and up the path toward the manor. Like a game of hot and cold, he chirped and whistled to keep them moving in the right direction. Inside the house, they walked down endless dark **mahogany** hallways lined with doors. Finally, Miguel took them to the final door. This was the room of Colin—the boy who most needed the secret garden's healing powers.

Miguel hopped out of Dickon's pocket and urged Dickon to open the door. From the bed, Colin stirred and sat up. Miguel climbed up into Colin's wheelchair and sang a **celebratory** song. Miguel knew the three would quickly become friends.



Growing Magic

The next day, with Colin in his wheelchair and the robin nestled in his lap, Miguel used his song to lead his friends through the pasture and down the pathway to the oaks and ivy surrounding the secret garden.

Despite his broken wing, Miguel managed to flitter onto the piece of ivy near the doorknob.

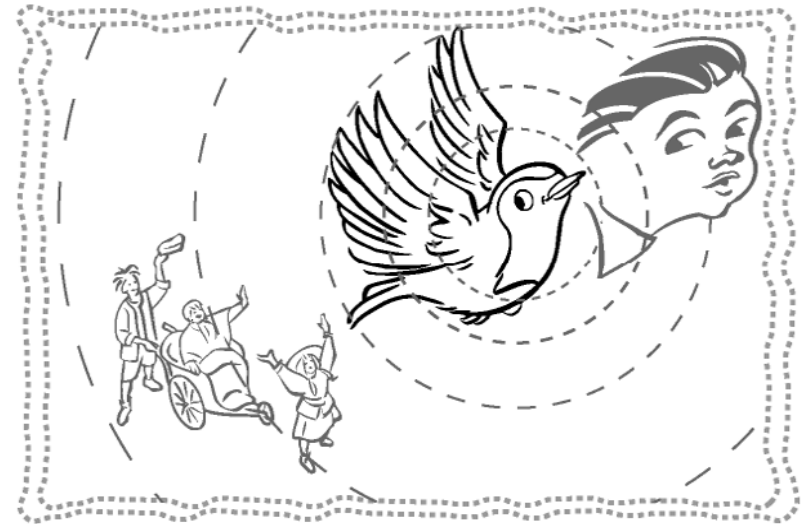
"The door to the secret garden!" Mary pulled out a key, stuck it in the lock, and turned it. *Click.*

As they walked in, Miguel felt a tingle of energy surge through his body.

Colin gasped. Mary ran in circles. Dickon laughed with joy. They had found the long sought-after garden!



However, the once-beautiful garden now had vines covering everything, and most of the other plants seemed dry and lifeless. But Miguel knew the trio could bring it back to life. Miguel knew that because of his help, the poppies, roses, and hollyhock would soon be in full bloom. Mary would be entertaining Colin and Dickon, and Colin would need his wheelchair less and less. Maybe Miguel's dad was right about gardens. They *are* places of healing.



Miguel lifted off the ground, encircling the garden a few times. He looked down on the three smiling kids and then shot through the clouds. Before he knew it, he was home in the quiet loft. A lavender rose lay on top of the chest.

Back outside, Miguel's dad was still pruning the roses. He held a bouquet full of colors, all except lavender. For the first time, Miguel found he enjoyed the sweet scent of roses.

His dad looked up. "Back from your break?"

Miguel nodded. He grabbed a shovel, slipped on his gloves, and put on a cap.

"This is for you," he said, handing his dad the lavender rose. "Thanks."

"For what?"

"For this." He waved his arms around the garden and then started working.



Glossary

celebratory	used to celebrate, or show happiness about a positive event (p. 19)
desperate	urgent or extreme (p. 5)
indecipherable	difficult or impossible to understand (p. 14)
instinct	impulse or reaction (p. 9)
insulated	protected; prevented heat loss (p. 8)
mahogany	a type of wood with a rich reddish-brown color (p. 19)
muster	summon; bring forth (p. 11)
spewed	poured (p. 14)
swivel	turn, as in a circle (p. 14)
three-dimensional	having height, width, and depth (p. 9)
updraft	an air current that moves upward (p. 10)

Name _____

Instructions: Fill in the *Make* column with your predictions about what will happen in *Miguel in the Secret Garden*. As you read, write what actually happened in the *Actual* column.

Actual	
Make	

Name _____

Instructions: Write what happened in the book in the order in which it happened.

Beginning

Ending



Name _____

Instructions: Read each sentence. Choose a word from the box that completes each sentence by changing the word into an adverb. Write the new word on the line in each sentence and circle the verb that each adverb describes. Then write two sentences of your own using adverbs and circle the verb that the adverb describes in each sentence.

sudden

usual

gentle

constant

quick

careful

clear

sad

1. Miguel _____ found an object from the story to help him on the adventure.
2. The lid on the chest _____ closed.
3. A current of air _____ lowered Miguel to a branch of ivy.
4. Miguel _____ remembered that robins didn't speak English.
5. Although he spoke _____ to Dickon, Miguel knew each word sounded like bird chatter.
6. Miguel _____ watched as Mary skipped away down the path.
7. Pain _____ jabbed throughout Miguel's right wing.
8. Miguel _____ jumped down onto the floor to where Mary was standing.

My Sentences

1. _____

2. _____



Name _____

Instructions: Match words in the left-hand column with words in the right-hand column to create compound words. Then write the compound words you created on the lines provided.

out	ball	_____
grand	knob	_____
door	thing	_____
grounds	one	_____
down	worm	_____
earth	father	_____
some	shake	_____
every	side	_____
milk	keepers	_____
base	stream	_____



Otzi: The Iceman

A Reading A-Z Level W Leveled Reader

Word Count: 1,638




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Otzi: The Iceman



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About 5,300 Years Ago

The man gently pushed aside the small brown dog yapping at his feet, tipping the basket of grain he was carrying just enough to spill. "Now see what a mess you've made." He smiled at the puppy through his irritation.

The man knew he had a lot to do to get ready for the hunt. He had no time to waste, as winter was closing in.





A tall, dark-haired boy walked over to the area of spilled grain and began scooping it up.

The man looked upon his son with pride. "You must take care of things while I'm gone."

"Yes, Father. I know."

Together, father and son placed the grain back in the basket while the dog played at their heels. The boy took the grain to an underground pit where it would be protected during the upcoming winter.



A recreation of Otzi and the belongings he took on his journey

The man and his son walked slowly back to their home. The man paused to stop and rub his legs.

He knew the weather would soon turn colder, which would make food scarcer.

Tension would be high in the community as men who weren't able to kill enough on the hunt fought over food for their families. It was important for him to leave the village soon and hunt for red deer, ibex, and wild boar. His family would need to live off the meat during the winter.

When the man returned home, he gathered his belongings together. He knew he needed to be prepared to face almost anything. Then he left his family and began his journey.

Traveling only a short distance from his home, the man killed an ibex and was carrying the meat. All of a sudden, an arrow whizzed by the man's ear. Then several more flew through the air, and one landed sharply in the back of the man's right shoulder.

The man clutched his arm in pain. Moaning, he reached behind with his left hand to withdraw the arrow but could not remove it entirely. He managed to walk slowly up a hill as he heard the men behind him taking the bundle of meat he'd dropped. Making it to the hilltop, he lay down and closed his eyes for the last time.



Little did the man know that his body would become frozen in ice and frozen in time, and that thousands of years later he would become known as Otzi, the Iceman.

Of course, this is just one possible way that Otzi, the Iceman, died. We really don't know for sure how it happened. All we can do is theorize, or make guesses based on the facts. Scientists collect facts—clues—before they make a **theory**. You can make a theory about how Otzi died, too. As you read the things we do know, think like a scientist and come up with your own theories.



"The Iceman" Otzi just after being pulled from the ice

Do You Know?

The Iceman was nicknamed Otzi by local people as a tribute to the area, Otztal, a valley near where the Iceman died.



Finding the Iceman

In September 1991, two German hikers, Erika and Helmut Simon, made an amazing discovery. High in the Tyrolean Alps, at more than 10,000 feet, near the border between Austria and Italy, they found a hairless, frozen body. Only the head and part of the shoulders could be seen above the ice.

They originally thought it was the frozen **corpse** of a modern climber. However, a few days later, Austrian scientist Rainer Henn came up with a different theory. The corpse was yellowed and dried, so he determined that it must have been frozen for a long time. He was right. The Iceman turned out to be about 5,000 years old.



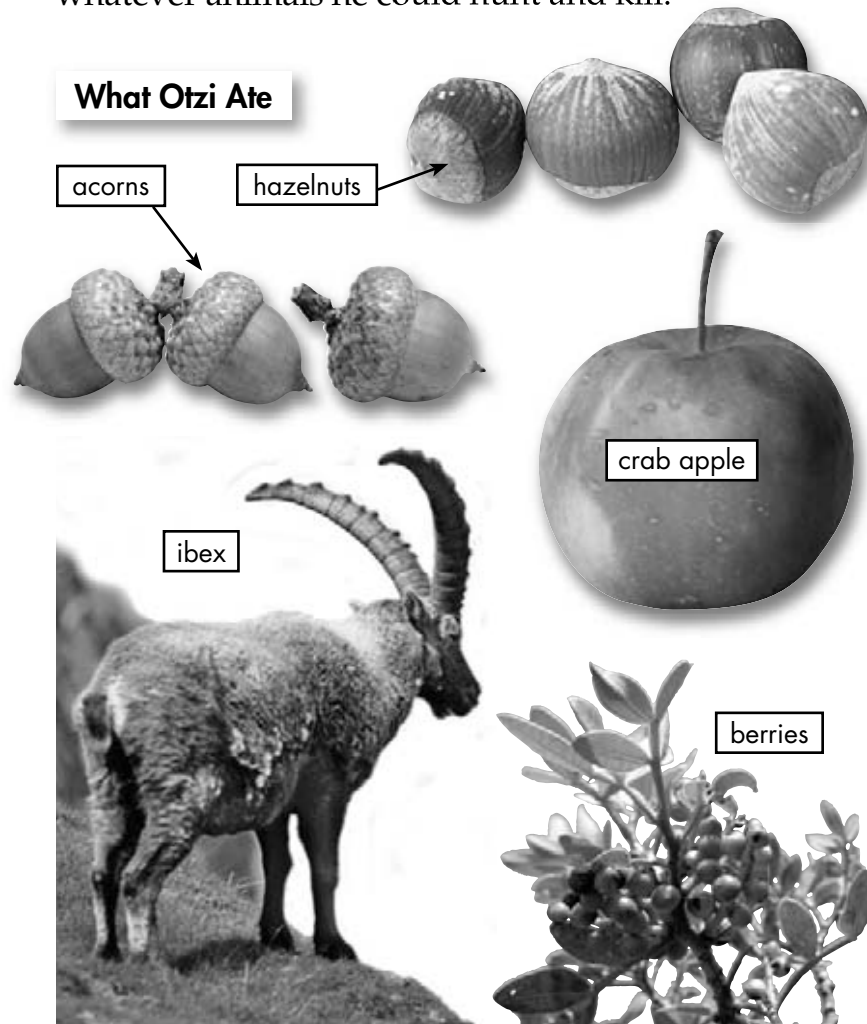
Scientists gather around the 5,300-year-old mummy of Otzi.

The Man Himself

Scientists used **carbon dating**, microscopic analysis, and X-rays on the Iceman's well-**preserved** body to gather clues about his appearance and physical condition. They determined that Otzi was short—only about five feet tall—weighed about 110 pounds, had wavy brown hair, and probably wore a beard.

They also figured out that he lived to be about 46 years old (an elder for that time) and was bothered by several medical conditions: a bad back, **arthritis**, worn joints, and a bad stomach.

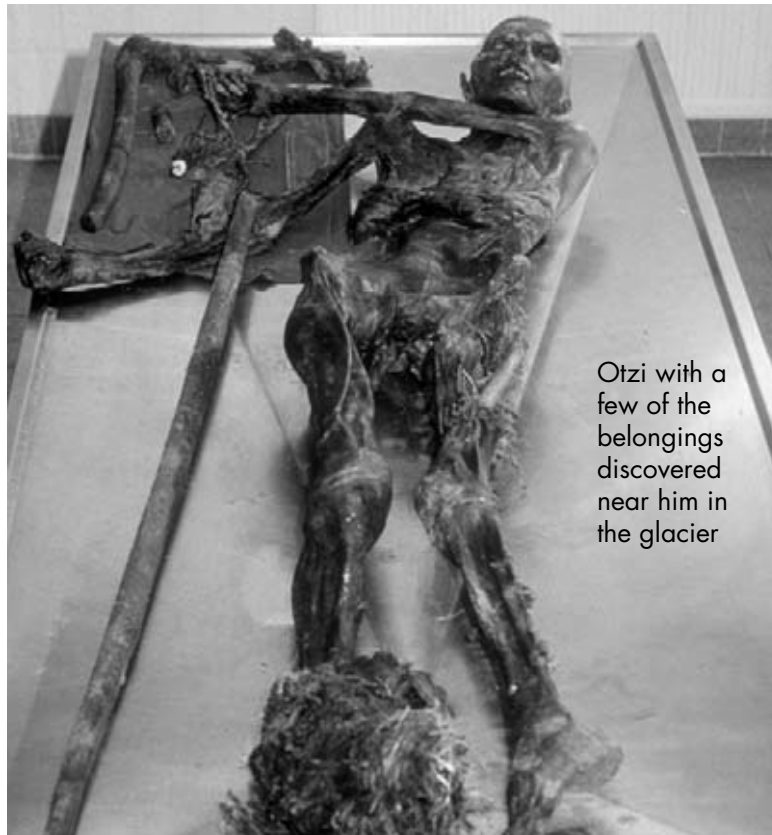
From Otzi's teeth, scientists were able to theorize about his diet. He probably ate mostly bread because his teeth were ground down, as they could only be from eating grains for many years, but he probably also consumed crab apples, berries, acorns, hazelnuts, and the meat of whatever animals he could hunt and kill.



Using these clues and others, scientists began to theorize how Otzi may have died.

Evidence Found with the Iceman

Copper ax	Sloe berry
Bow	Stone disk on a leather string with fringe
Arrows, one with traces of blood from two people	Mushrooms tied on a leather string
Quiver for arrows	Tests revealing that Otzi likely had arthritis and suffered from back pain
Knife, with traces of blood from another person	Long-sleeved jacket or vest made from animal hides, with traces of blood from another person
Grass sheath for knife	Woven grass cloak
Strips of felt	Leather pouch
Birch bark container	Leather pants
Flint	Waterproof shoes
Wood-frame backpack	Fur hat
Wooden stick with deer antler tip	Grass socks
Bone awl	Tattoos
Cuts on Otzi's hands and wrists	
Ibex (wild goat) meat	



At first, investigators thought the Iceman got caught in a storm, fell asleep, and died from the cold. But later theories seem to support the idea that the Iceman was killed. Blood was found on Otzi's clothes, and wounds were discovered on his body. A number of scientists believe that the **evidence** supports the theory that the Iceman died from an arrow wound to his back and knife wounds to his hands. But why? Why would someone want to kill Otzi? There are several theories.



Theory 1: An Accident

While Otzi was hunting, he was accidentally shot by other hunters and then buried.

Scientists think that Otzi was hunting because of the clothing he was wearing and the equipment he was carrying when they found him frozen in the **glacier**.

From the many scraps of material they found (leather, fur, grass, bearskin, cowhide, tree bark) on his body, scientists think that the Iceman wore leather pants and a long-sleeved jacket or vest made of deer, goat, and ibex hide, with the fur side turned out, and possibly a long, woven grass cloak.

They guess from the clues that his shoes were waterproof and wide—seemingly designed for walking across the snow—constructed by using bearskin for the soles, cowhide or deer for the top panels, and netting made of tree bark. They think soft grass was wound around his feet to function like warm socks. Grass laces, kept dry by a leather flap, were strung through eyeholes to keep Otzi's size-six feet snug.

Scientists also theorize that the Iceman wore a hat that was made of individual cut pieces of fur, probably bearskin, sewn together. Attached to the hat were two leather straps that might have been used as a chinstrap.

These articles of clothing, scientists think, would be what one would wear going on a long trek, like a hunting expedition. This belief was reinforced by the type of equipment Otzi had with him.

Here's what scientists found: a copper ax, a bow, arrows, a quiver, and a tiny knife. Scientists think that Otzi used the bow and arrows to hunt deer and ibex, the knife to clean the animals, the ax to chop firewood, and the quiver to hold the arrows.

Otzi also carried two strips of felt and a small container made of birch bark. Scientists think he may have used the felt as tinder for starting fires and the birch-bark container to carry the felt.

Next to the container was a soft leather pouch with two pieces of flint, which were probably used for making tools and for striking sparks to start fire. A four-inch wooden stick with a tip made of deer antler may have been used for sharpening the chunks of flint.

Based on this evidence and knowledge of the time period, some scientists theorize that Otzi was hunting and may have accidentally been caught in a crossfire of arrows from other hunters.



Director Kurt Muendl, left, and an actor from his film about Otzi's last year of life show off the ax and bow made to look like those found with the Iceman.



Theory 2: Murder for Food

Otzi was not killed accidentally, but was killed on purpose in a fierce battle with other hunters.

Other scientists disagree with the accidental death theory. They think that while Otzi was hunting ibex, he encountered a group of starving hunters. The hunters desperately needed a kill and did not want Otzi taking the kill from them, so they attacked him, firing arrows. Otzi fired back.

Dr. Tom Loy, director of the Queensland National Institute of Molecular Bioscience, thinks that the Iceman fired two arrows into two of his enemies, pulling his precious weapons out of their bodies each time. His theory explains why traces of blood from four other people were found on Otzi's belongings: one from his knife, two from the same arrowhead, and a fourth from his coat.

In addition to his attackers shooting arrows at him, they may have attacked him with a knife. Perhaps cuts on Otzi's hands and wrist were from his attempts to defend himself.

Many scientists hold this theory to be true, but some wonder whether Otzi was killed for yet another reason.





Theory 3: Murder for Power

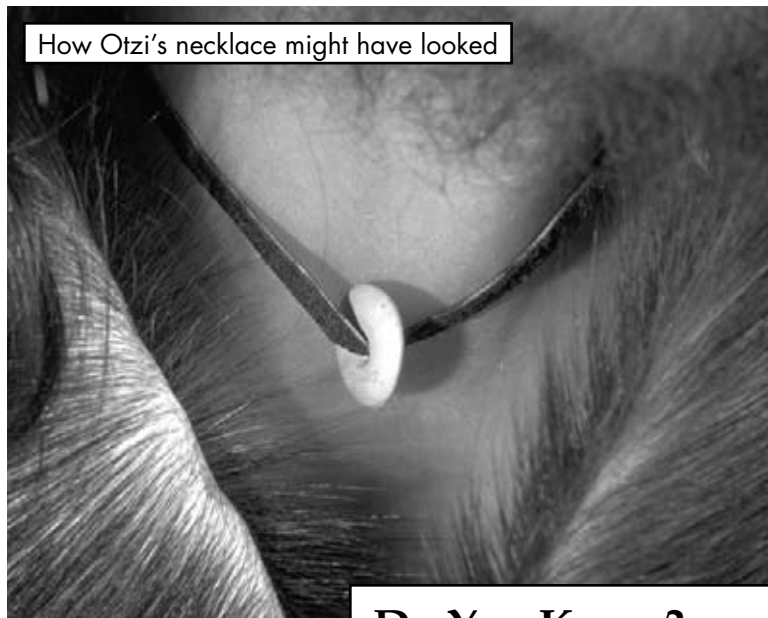
Members of his community killed Otzi, a shaman, because he had become too powerful.

Walter Leitner of the Institute for Ancient and Early History at the University of Innsbruck in Austria thinks that the Iceman might have been a **shaman**. A shaman is a physical and spiritual healer who is thought to have the capability of traveling to and from the spirit world for medicine.

When scientists examined Otzi's body, they found a large number of mysterious **tattoos**. The tattoos included stripes, a cross, and small bars. These weren't decorations meant for others to see, for they appeared only on parts of his body that would have been hidden by clothing. Were these 57 crudely carved tattoos found on the Iceman's ankles, knees, and calves an ancient form of **acupuncture**? They were located on, or near, acupuncture points that would be used to treat ailments that Otzi likely suffered from—arthritis and back pain.



A recreation of one of Otzi's many tattoos



How Otzi's necklace might have looked

Do You Know?

A small depression was found in Otzi's right earlobe. Did this mean that he wore an earring?

Some scientists think that Otzi may have worn jewelry, too. When his body was found, a leather string with a fringe, strung through the two-inch disk made of white stone lay nearby. Could this mysterious object have been worn by a medicine man, like Otzi, as a necklace?

Near Otzi's body, researchers also found two mushrooms on a piece of leather. Scientists know that this kind of mushroom can be used to fight sickness. Was Otzi carrying them as medicine—something the hunters needed? Was the Iceman really a shaman?



A Secret Kept

These are just a few of the scientific theories about the Iceman. They change when the facts—the clues—change. But sometimes the clues remain the same and the scientists reinterpret the facts differently. How do you interpret the facts? What kinds of theories do you have now from the facts about how Otzi may have died?

The Iceman could have died in a vast number of possible ways. For now, though, he is still keeping the true story a secret from us.

Glossary

acupuncture (<i>n.</i>)	a treatment where needles are inserted into the skin at specific locations on the body to relieve pain (p. 20)
arthritis (<i>n.</i>)	a disease in which one's joints swell and stiffen (p. 10)
carbon dating (<i>v.</i>)	using chemicals to determine the age of something (p. 10)
corpse (<i>n.</i>)	a dead body (p. 9)
evidence (<i>n.</i>)	information that can prove something true or false (p. 13)
glacier (<i>n.</i>)	a large accumulation of ice and compacted snow in a mountain valley (p. 14)
preserved (<i>v.</i>)	kept in the same condition (p. 10)
shaman (<i>n.</i>)	a spiritual and physical healer (p. 19)
tattoos (<i>n.</i>)	permanent marks made on the body with ink (p. 20)
theory (<i>n.</i>)	a possible explanation (p. 8)

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Reading a-z

[illegible]

OTZI: THE ICEMAN • LEVEL W • 1

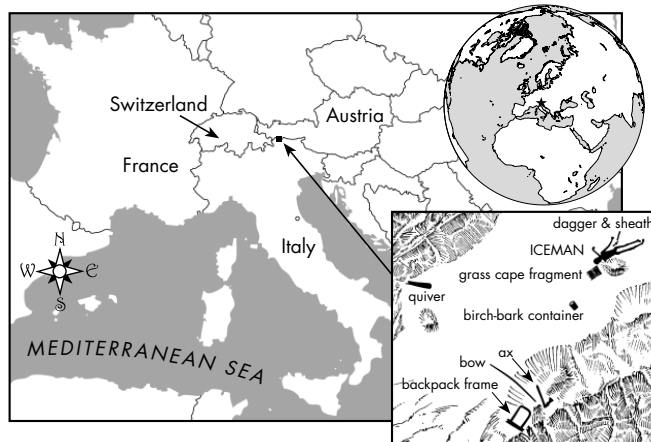
SKILL: MAIN IDEA AND DETAILS/SUMMARY

Name _____

Instructions: Read the sentences and underline the adverb in each sentence. In the space provided, write whether the adverb tells how, when, or where something happened.

1. The boy ran swiftly to the park. how
2. He managed to walk slowly up a hill as he heard the men behind him. _____
3. The man gently pushed aside the small brown dog. _____
4. The man and his son finally walked back to their home. _____
5. Sometimes scientists reinterpret the facts differently. _____
6. He knew the weather would quickly turn colder, making food scarce. _____
7. Arrows suddenly whizzed by Otzi's ear. _____
8. He immediately reached behind to withdraw the arrow. _____
9. He could not remove the arrow entirely. _____
10. Otzi eventually closed his eyes for the last time. _____

Where Otzi Was Found



Name _____

Instructions: Define each base word using a dictionary. Then fill in the blank in each sentence by adding a prefix to a base word. Use context clues and the definitions of the base words to choose the correct word for each blank.

approve: _____

assign: _____

build: _____

connect: _____

obey: _____

place: _____



re- dis-

1. We had to _____ the barn after the tornado.
2. When the old toaster broke, we bought a new one to _____ it.
3. We always _____ the TV from the outlet during an electrical storm.
4. Based on our comprehension, our teacher decided to _____ the lesson.
5. My parents would _____ of any bad behavior on my part.
6. I know there will be consequences if I _____ my parents.

Ben Franklin

A Reading A-Z Level W Leveled Reader

Word Count: 1,893

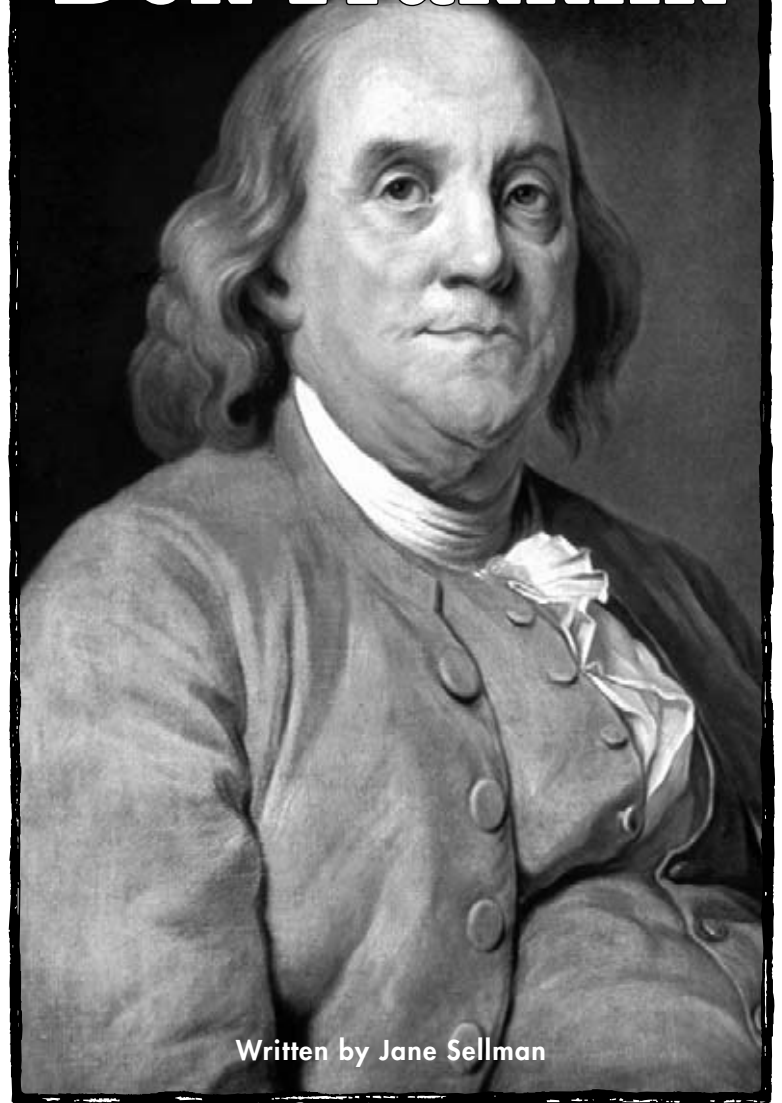


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LEVELED READER • W

Ben Franklin



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Ben Franklin



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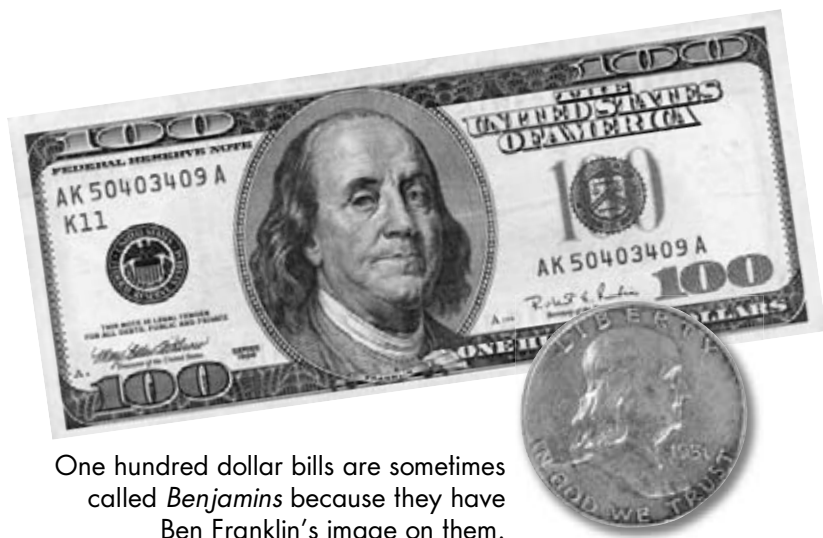
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Correlation

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One hundred dollar bills are sometimes called *Benjamins* because they have Ben Franklin's image on them.

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Introduction

Do you have a public library near you?
Thank Benjamin Franklin.

Do you have lights to read by?
Thank Benjamin Franklin.

Does your mail come right to your door?
Do you get to play outside later in the summer
because it stays lighter longer?
Thank Benjamin Franklin.

Do you live in a free and independent country?
Thank Benjamin Franklin.

How did one man do so much?

Early Life

“ . . . All the little money that came into my hands was ever laid out in books.”

Born on January 17, 1706, to Josiah and Abiah Franklin in Boston, Massachusetts, Benjamin Franklin was the youngest son of 17 children. His father worked hard making candles and soap. His mother managed the large household.

When he was eight years old, Ben started school. He liked learning and did well in all his subjects except arithmetic. However, Josiah and Abiah could not pay for years of school for their children. Only the wealthy could afford that. So 10-year-old Ben went to work for his father. He cut wicks and filled the molds for candles. He cleaned up the shop, ran errands, and spent hours near vats of boiling tallow. Tallow is a fat that comes from sheep and cows. Ben thought it smelled awful.

This candle-making shop was probably similar to the shop where Ben worked for his father.



Ben dreamed of being a sailor. He loved the water and swam in the local pond with his friends every chance he had. Once he took a kite to the pond, and as he held onto the kite string, the air pulled the kite. He relaxed and let the kite pull him across the pond.

Ben's parents did not want him to be a sailor because of the dangers he would face on long ocean voyages. So Josiah took Ben to visit bricklayers, carpenters, and blacksmiths. He hoped that Ben would find a job he liked. Ben learned skills he later used in his own home; however, he did not find a job.

Though he wasn't in school, Ben read as much as possible. He read all of his father's books and used his **meager** spending money to buy more books.

Josiah noticed that Ben loved books. James, one of Ben's brothers, had recently set up a printing business. At last, Josiah knew the perfect job for Ben.



A painting shows Boston Harbor in the 1700s.



Apprentices like Ben set metal letters by hand for each word in a document. They worked right to left as the type needed to be backward to print correctly.

A Young Apprentice

*"Hope of gain
Lessons pain."*

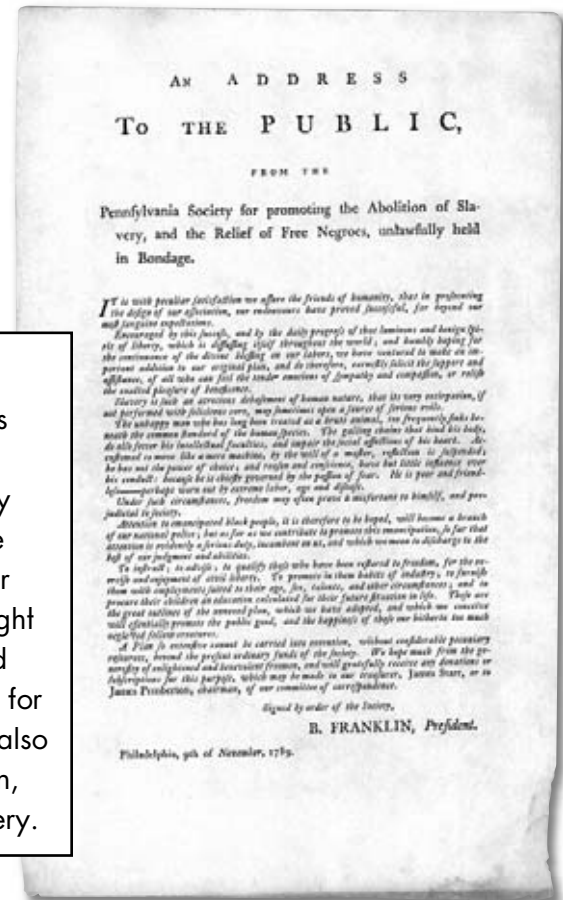
Josiah arranged for Ben be an **apprentice** to James. Ben, now 12, would work for James and learn printing. He would do this until he turned 21. For eight years, he would receive no pay, just food and a bed. In his last year, he would get a small **salary**.

Ben became good at setting the type (the letters) for books and newspapers. He soon became friends with other apprentices. Some worked for booksellers, and they lent him books. He read for hours at night so he could return a book the next day.

Ben wrote this letter asking the people of Philadelphia to support an end to slavery.

Being Fair

While Ben was an apprentice, he felt he was unfairly treated. This made him strive to be fair to others. He thought that women should have opportunities for an education. He also supported abolition, or the end of slavery.

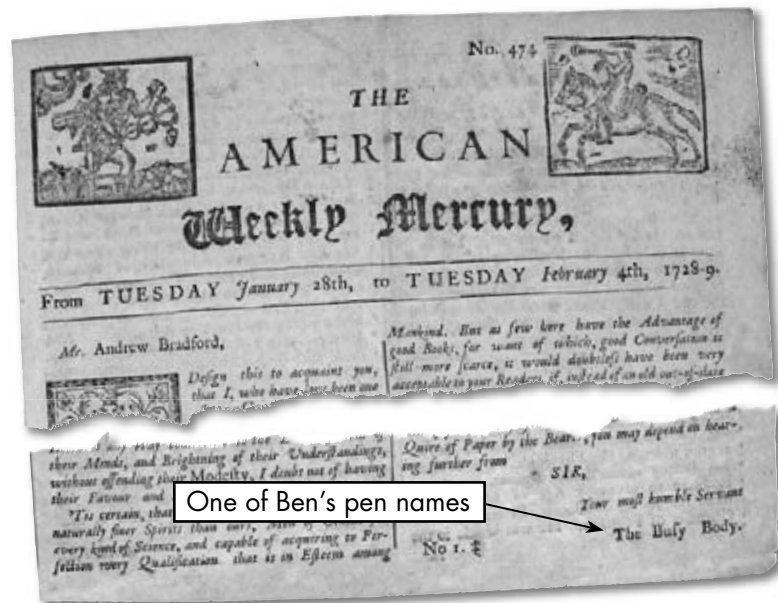


Ben ate alone and studied. He used any extra money to—you guessed it—buy books. He even tackled arithmetic again and became good at it.

Ben started writing too. He would read an **essay**, put it aside, and later re-write it from memory. He even wrote a few poems. But, his father said that poets made no money, so Ben should stick to writing essays.

Ben even **contributed** to a newspaper James published called the *New England Courant*; though James did not know it for a while. James and his friends, using pen names, wrote the newspaper's articles. They even wrote the letters to the editor. Ben decided to write a letter, but he did not tell James. Ben pretended to be a middle-aged woman named Silence Dogood. He slipped his first letter to the editor as Silence Dogood under the door of the print shop. James printed it. People liked it. Ben wrote more letters. Soon James found out his little brother wrote the letters and became annoyed.

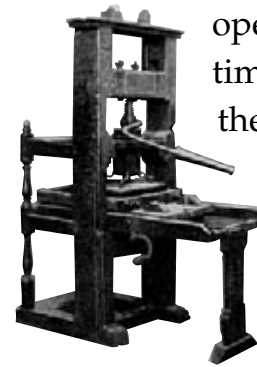
Ben and James had not been getting along. Josiah often had to settle arguments between them. Finally, at age 17, Ben left Boston to find work elsewhere.



Printer and Businessman

"He that can have patience, can have what he will."

Ben found work in another print shop in Philadelphia, Pennsylvania. He worked hard so that he could follow his dream of one day



1700s printing press

opening his own shop. During this time period, Great Britain controlled the American **colonies**, including Pennsylvania where Ben lived.

In 1724, Ben left for London to buy printing equipment for his own business with money promised by a new friend, Governor William Keith.

Ben found London to be an exciting place. He stayed for two years, gaining more printing experience. He also had fun and made friends. He hung out in coffee shops to discuss and **debate** ideas.

Do You Know?

In the 1700s, people were reading more than in the 1600s. They were learning how to discuss issues. They began to value logical thinking and to question traditions. They proposed new ways of looking at the world. They even began to challenge government. This time period was called the *Enlightenment*.



A young Ben working in his own print shop

The money that Ben's friend promised never came, so Ben could not start his business. A kind **merchant** helped him get home to Philadelphia, where he returned to the printing trade.

Ben was only 22 when, in 1728, he finally opened a print shop in Philadelphia. He published a newspaper, the *Pennsylvania Gazette*, and used it to inform people and to speak his mind. He soon became the official printer for Pennsylvania.

Family Man, Community Activist

"Be civil to all; sociable to many; familiar with few; friend to one; enemy to none."

Ben married Deborah Read in 1730. She helped him run the print shop—where they also sold stationery as well as his father's soap and candles. Ben had a baby son, William, from a past romance. He and Deborah raised him. They had two more children, Sarah and Francis, but Francis died of smallpox when he was four. Sarah was nicknamed Sally. She loved to read, just like her father.



Soon Ben started one of his most popular **publications**, *Poor Richard's Almanack*. An almanac contains information on the tides, the times for sunset and sunrise, and the weather. This bestseller included many of Ben's well-known sayings such as, "Early to bed and early to rise, makes a man healthy, wealthy, and wise."



Ben is seated at a desk in the lending library he organized with friends.

Busy as he was, Ben also had other interests. He remembered when he spent spare pennies to buy books, so he and his friends organized the first lending library. Ben also started the first volunteer fire company in the colonies. He even founded a school that eventually became the University of Pennsylvania. He and his friend, Dr. Thomas Bond, founded a hospital together.

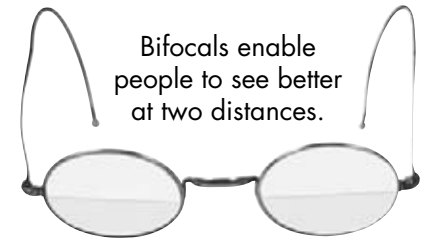
People noticed that Ben got things done. The government put him in charge of mail delivery. He improved it. His daughter, Sally, sometimes went with him when he rode along the mail route.

Inventor and Scientist

"In success be moderate."

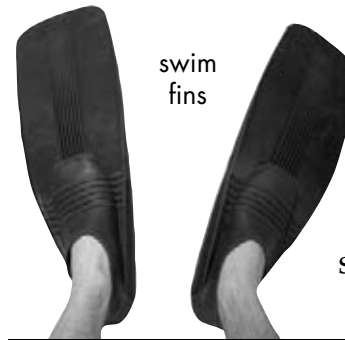
For twenty years, Ben built up his printing business. He had print shops in other cities, too. He and Deborah saved much of the money he made, which allowed Ben to retire early and devote time to his many **passions**.

Ben liked to invent things that improved everyday life. He had already designed a stove that gave more



Bifocals enable people to see better at two distances.

heat than the ones most people were using. He also invented swim fins, bifocals, and an



swim
fins

extension arm to reach books on high shelves. He improved streetlights and suggested Daylight Saving Time as a way to save money on lighting.

1717	1729	1731
Invents swim fins	Proposes the use of paper money	Starts America's first lending library



Ben founded the American Philosophical Society, a club where scientists could gather for study and discussion. Ben wished to study weather and **electricity**. He believed that storms traveled from one place to another. Like other scientists, he thought that lightning was electricity. He wanted to prove this.

One afternoon, Ben and his son, William, went outside to a meadow because they had seen a storm coming. Ben had made a kite out of silk and wood. He attached a stiff wire to the top of his kite; then tied a silk ribbon to the kite string. He tied a key to the ribbon. Ben and William wanted the ribbon to stay dry so they stood inside a shed and flew the kite from the doorway. As the storm increased, Ben and William saw loose threads on the string standing up.



This painting shows what it would have been like the day of Ben's kite experiment.

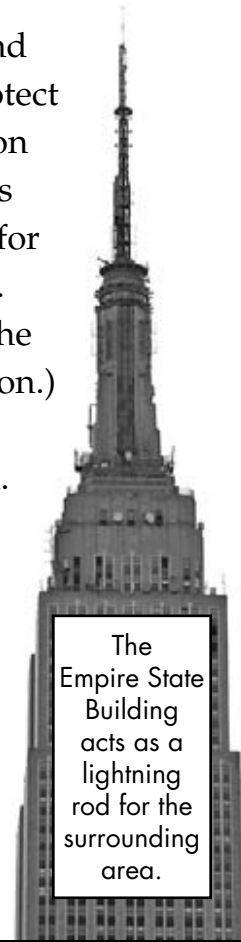
Carefully, Ben put a knuckle near the key. Ouch! He got a tiny shock and saw a spark. Now Ben was convinced that lightning was electricity.

Lightning often caused fires, and Ben wanted to invent a way to protect buildings and people. His invention was called a lightning rod, and it is still used today. He did not apply for a patent. (A patent is like a license. It says that no one else can make the same thing without your permission.) This allowed anyone to use his inventions without his permission.

How It Works

A lightning rod is attached to the highest part of a building. The rod has a wire attached to it that leads to the ground. When lightning hits the rod, the electricity goes along the wire and safely into the ground.

The Empire State Building acts as a lightning rod for the surrounding area.



1736		1737
Organizes a volunteer fire company		Becomes Postmaster of Philadelphia and improves mail delivery

Founding Father

"Those who would give up essential liberty, to purchase a little temporary safety, deserve neither liberty nor safety."

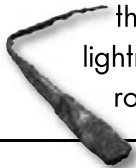
Ben was generous with his time, as well as his inventions. He spent many years trying to help the colonies and later played an important role when the colonies sought their **freedom** from Great Britain.

As early as 1754, Ben talked about uniting the colonies. He even went overseas many times to work out problems between the colonies and Great Britain's government. He tried to educate the British about the colonies. Ben even convinced some of the British people that the colonists could govern themselves.

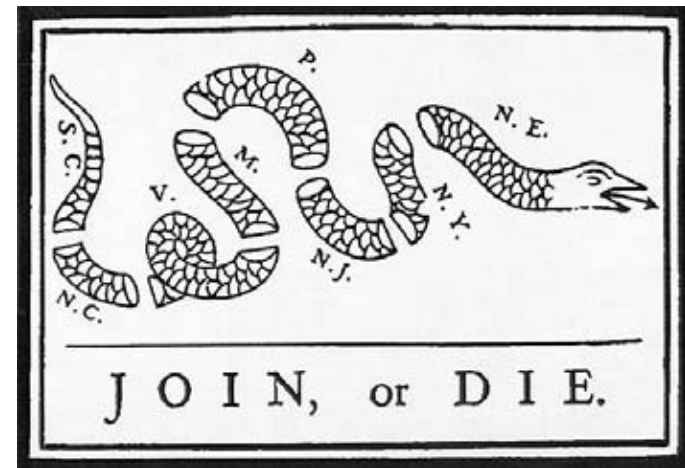


Ben's lightning rods as they appeared in his book describing the experiments.

1739	1741-1744	1750
Leads a protest against pollution	Invents the Franklin stove; publishes one of America's first magazines	Invents the lightning rod



Ben had always been a loyal citizen of Great Britain. Just the same, he believed the colonies, which were an ocean away and better able to defend themselves, should be independent from Great Britain. In 1775, Ben became a **delegate** to the Continental Congress, a group of colonists who worked for independence from Great Britain. The delegates argued constantly. Ben became a peacemaker and negotiator.



Some colonists did not want independence from Great Britain. Ben urged them to unite for independence using this political cartoon.

1751	1752	1754
Develops methods for keeping city cleaner and dealing with garbage	Conducts kite experiment	Proposes that the colonies unite; prints America's first political cartoon



Ben also joined the committee formed to write the Declaration of Independence, the document proclaiming the colonies' independence. Thomas Jefferson did most of the writing, but Ben made a few suggestions. After it was finished, everyone in the Continental Congress read it. Of course, every member had a change or a suggestion. Ben sat down with Thomas. He knew that Thomas was bothered by the many changes. Ben was a good friend and told him a funny story to try to cheer him up.



Ben reads a copy of the Declaration of Independence with John Adams (center) and Thomas Jefferson.

1762	1764	1773
Invents glass armonica—a musical instrument	Proposes the idea of Daylight Saving Time	Theorizes that the common cold is passed from person to person



Ben attends a reception in his honor in France.

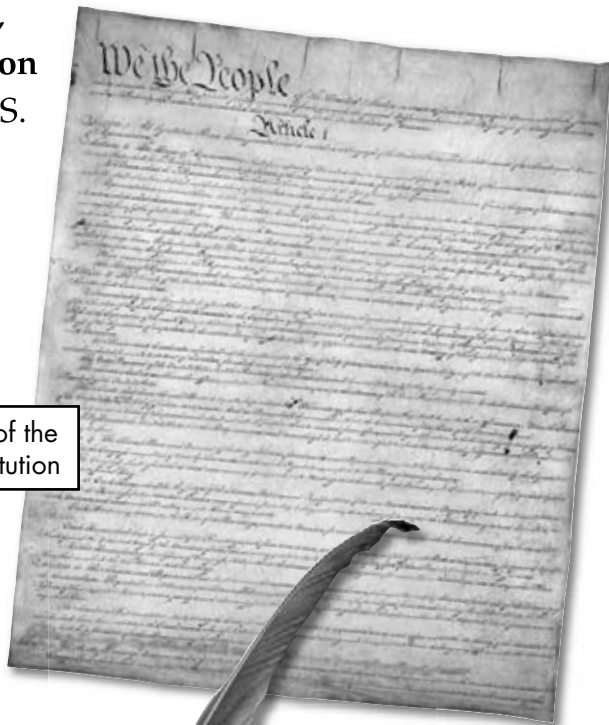
Ben was now in his seventies. He would have liked to take it easy; however, the colonists wanted him to go to France to get help in their fight for independence. Luckily, the French loved Ben. They thought he was friendly, funny, and down-to-earth. He made great friends there. During the American Revolution, France helped the colonies in their fight for independence.

1775–1776	1784	1786
Helps to write and signs the Declaration of Independence	Invents bifocals	Invents extension arm for taking books down from a shelf



After the revolution, Ben helped establish peace between the new United States of America and Great Britain. He also was elected president of Pennsylvania three times. Before he retired from public duties, he took on one more job. In 1787, he became part of the Constitutional Convention and helped to create the U.S. Constitution, the **foundation** of today's U.S. government.

First page of the U.S. Constitution



1787	1789
Helps to create the U.S. Constitution	Becomes President of the Society for Promoting the Abolition of Slavery



Conclusion

"All would live long, but none would be old."

During his last years, Ben became bedridden. However, he still read and wrote. Deborah, his wife, had died many years before. His daughter, Sally, and her family moved in to take care of him. He enjoyed the company of his family, especially his grandchildren. Every afternoon, his granddaughter, Deborah, would bring her spelling lesson. They would go over the words together. When she did well, he would give her a spoonful of jelly.

Three months after his 84th birthday, one of America's greatest writers, leaders, inventors, and patriots, Benjamin Franklin, died.

Glossary

apprentice (<i>n.</i>)	someone who learns the work of a trade from a skilled professional (p. 7)
colonies (<i>n.</i>)	towns, cities, territories, or groups of people controlled by another country (p. 10)
contributed (<i>v.</i>)	to have done or given something to a person or cause (p. 9)
debate (<i>v.</i>)	to discuss an important subject at length and in detail (p. 10)
delegate (<i>n.</i>)	a person who represents other people (p. 18)
electricity (<i>n.</i>)	energy created by moving charged particles; especially as a source of power (p. 15)
essay (<i>n.</i>)	a short piece of writing that gives the writer's ideas, feelings, and opinions on a particular subject (p. 8)
foundation (<i>n.</i>)	the beginning point and support from which something develops (p. 21)
freedom (<i>n.</i>)	the state of being free, or having the right and power to act and think as one wishes (p. 17)

meager (<i>adj.</i>)	low; too little to be worth much (p. 6)
merchant (<i>n.</i>)	a person who buys and sells goods or products (p. 11)
passions (<i>n.</i>)	objects or activities that create intense feelings or interest (p. 14)
publications (<i>n.</i>)	sources, especially printed materials, by which information is communicated to the public (p. 12)
salary (<i>n.</i>)	a fixed amount of money received for work, usually calculated per year (p. 7)

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Name _____

Instructions: In the first notebook, write what you already know about Ben Franklin. In the second notebook, write what you would like to learn. After you finish reading, fill in the third notebook with information you learned and the fourth notebook with what you still want to know.

K: What I know

W: What I want to know

L: What I learned

S: What I still want to know

Name _____

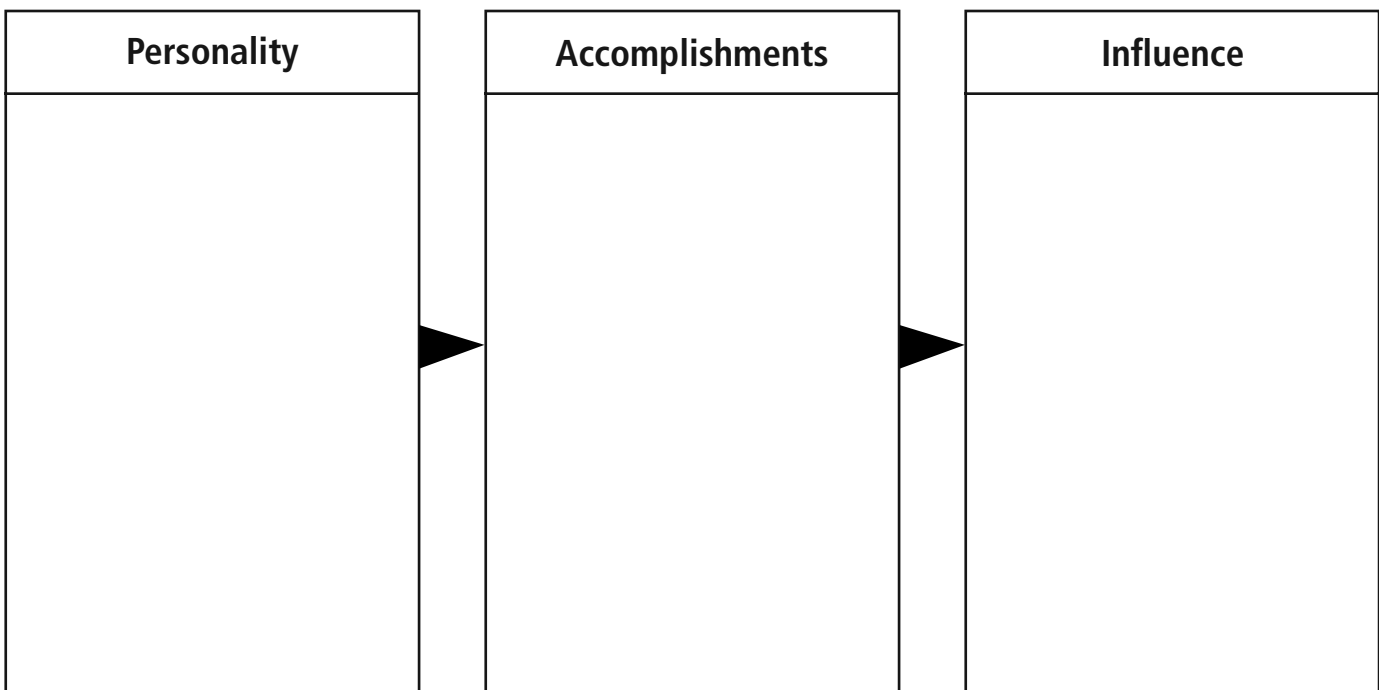
Instructions: In the chart below, list information from the book that reflects Franklin's personality, accomplishments, and influence on others. After reading, use the flow chart to briefly explain how the quote reflects Franklin's personality, how his personality influenced his accomplishments, and how his accomplishments influence the world.

Personality	Accomplishments	Influence



"Energy and persistence conquer all things."

—Ben Franklin



Name _____

Instructions: Write *C* on the line if the sentence is a compound sentence and *NC* if the sentence is not a compound sentence. Circle the conjunction that separates the two parts of each compound sentence. Then write your own compound sentence on the lines provided.

- _____ 1. The money that Ben's friend promised never came, so Ben could not start his business.
- _____ 2. They had two more children, but Francis died of smallpox when he was four.
- _____ 3. He remembered when he spent spare pennies to buy books, so he and his friends organized the first lending library.
- _____ 4. At last, Josiah knew the perfect job for Ben.
- _____ 5. He and Deborah saved money, which allowed Ben to retire early.
- _____ 6. Like other scientists, he thought that lightning was electricity.
- _____ 7. Lightning often caused fires, and Ben wanted to invent a way to protect buildings and people.
- _____ 8. Thomas Jefferson did most of the writing, but Ben made a few suggestions.



My compound sentence:

Name _____

Instructions: *Multiple-meaning words* are words that sound and are spelled alike, but have different meanings. Read each word. Then write two sentences, each using a different meaning of the word.

Word	Sentence
book	1. _____

	2. _____

coast	1. _____

	2. _____

fair	1. _____

	2. _____

land	1. _____

	2. _____

ruler	1. _____

	2. _____

Alberto Salazar: An American Runner

A Reading A-Z Level W Leveled Reader

Word Count: 1,745



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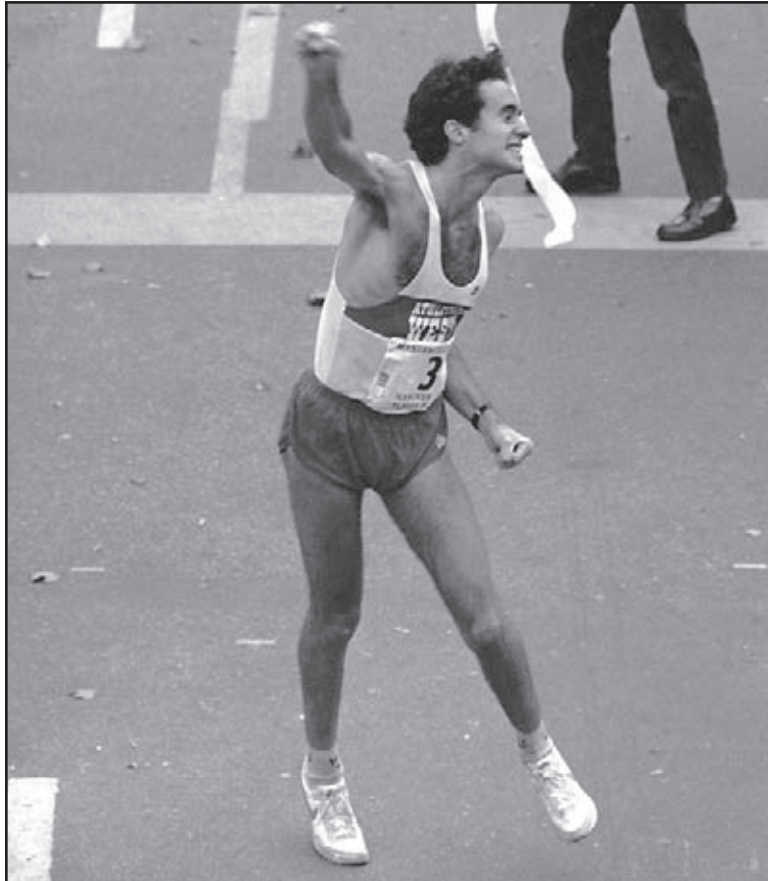
Alberto Salazar: An American Runner



Written by Steven Accardi

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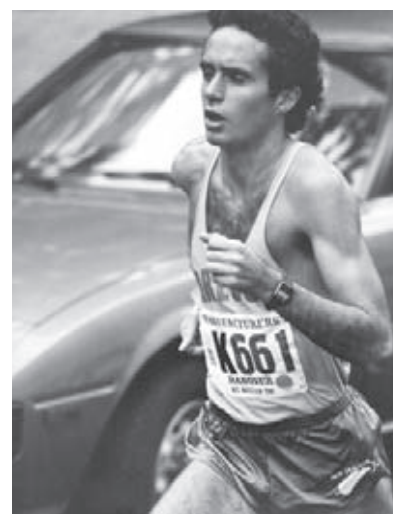
Alberto Salazar, right, runs in the New York City Marathon.

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Quick Start

Have you ever run the mile in gym class? If you haven't yet, you soon will. The mile is a difficult distance to run. It's long and **arduous**. So, unlike dashes, you cannot run at full speed (sprint) the entire way. But what if you could? What if you could sprint the mile without getting tired? How fast do you think you could run it . . .



Alberto Salazar runs his marathon debut in 1980.

in nine, eight, or seven minutes? How about five? Alberto Salazar could. He could not only easily run a mile in five minutes, but he could also run 26 five-minute miles, all in a row, without stopping. Actually, when he won the New York City Marathon in 1981,

he ran even faster than that. He finished the 26.2-mile course in two hours, eight minutes, and thirteen seconds—you do the math. It was a new world record for the time. How did he run so fast for so long? It wasn't easy—and it came with consequences.

Math Minute

On average, how fast (in minutes) did Alberto Salazar run each mile of the New York City Marathon in 1981? He ran the 26.2-mile course in 2 hours, 8 minutes, and 13 seconds.

Hint: Convert all the time to seconds and divide. Then convert the answer to minutes.



Two years after being born in Havana, Cuba, in 1958, Alberto moved with his family to the United States. First they lived in Miami, Florida; shortly thereafter they moved to Manchester, Connecticut; and finally, nine years later, they moved to Wayland, Massachusetts. It was there, in the small town outside of Boston, that Alberto met Don Benedetti, the cross-country and track coach of Wayland High School.

As a kid, Alberto would run with (and attempt to keep up with) his older brothers. But it was Coach Benedetti who inspired Alberto to work hard and transform his natural talent into something special. Alberto quickly became the fastest runner in the school—and the state. In fact, he became so fast that Coach Benedetti allowed him to train with the Greater Boston Track Club—an elite distance-running group that boasted some of the swiftest runners in the country, including Bill Rodgers, who was soon to become the world's best marathoner.



Alberto in high school

Even though Alberto was only 17 years old, by far the youngest on the team and nicknamed “The Rookie,” he never was **intimidated**. He welcomed the challenge and gave it his all, just like he did when chasing his brothers, and it paid off. By the time he graduated high school, Alberto could run two

miles in under 9 minutes—less than 4 minutes and 30 seconds a mile.



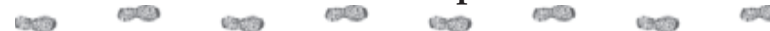
Alberto, right, runs up a grassy hill with University of Oregon teammate Rudy Chapa.

His fast marks drew interest from college coaches around the country. But Alberto only wanted to run for one school: the University of Oregon, which had the top cross-country team in the country at the time. The coach was former Olympian Bill Dellinger, who coached running **phenomenon** Steve Prefontaine. Alberto got what he wanted when Coach Dellinger asked Alberto to join his team, which allowed Alberto to continue his steadily growing running career. He helped the Oregon team win the national cross-country title as a sophomore and won the individual title as a junior. However, it wasn't until his post-college years that Alberto really shined.



More than 16,000 people ran the New York City Marathon in 1981.

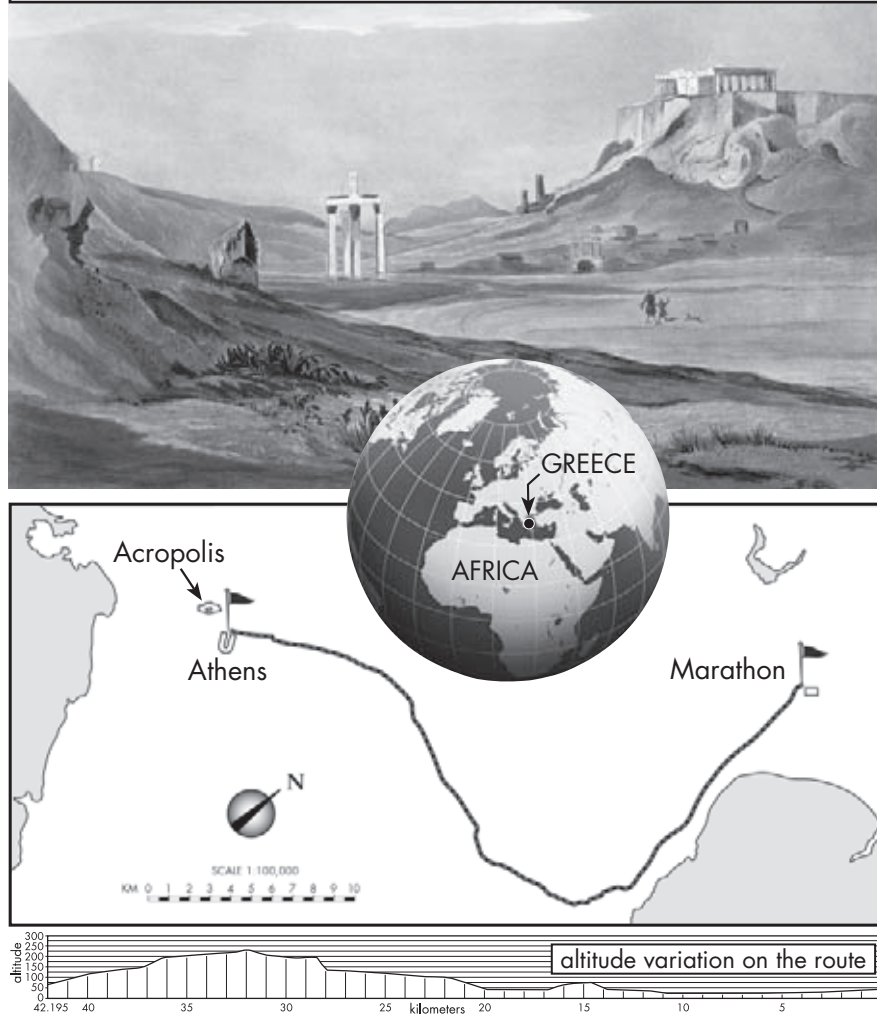
First Steps



In 1980, Alberto was only well known within college sports, but that would soon change. As a 22-year-old college graduate, he decided to run the New York City Marathon, and suddenly he became a celebrated athlete throughout the world. The marathon is a grueling race, requiring the highest degree of physical and mental strength. Many runners have become so overwhelmed with **fatigue** that they quit the race. Others have suffered injuries halfway through it. Some runners have even died before finishing it.

What Is the Marathon?

The marathon honors the endurance of the Greek soldier Pheidippides who, in 490 BC, ran from a battlefield near Marathon, Greece, to Athens, bringing news of victory over the Persians. After covering the distance of nearly 26 miles (42 km) and delivering the message, he collapsed and died. Ever since, that distance has been considered the mark of an elite athlete.



Alberto had never run the marathon before, but after so many successes in college, he was up for the new challenge. When asked what time he thought he would clock for his **debut**, he predicted 2:10 (2 hours and 10 minutes). Many of the sports reporters covering the event scoffed. No runner in his or her first marathon had ever achieved such a swift time. Some writers even grew upset and called Alberto cocky. He responded that he was confident, had put in the training, and was mentally prepared. It turned out that Alberto was a man of his word, shocking the world.

Not only did Alberto cross the finish line in 2:09:41, but he also won the race. It was the second-fastest debut marathon in U.S. history, behind his old teammate from the Boston Track Club, Bill Rodgers (2:09:27). The following year, Alberto won the New York City Marathon again,

this time in 2:08:13, setting a world record. In 1982, he won yet again. However, most don't remember 1982 as the year Alberto won in New York for the third straight year; they remember it instead as the historic year of "The Duel in the Sun" at the Boston Marathon.





Alberto looks over his shoulder to check the progress of Dick Beardsley as they near the finish of the Boston Marathon.

Boston: A Turning Point

The Boston Marathon is one of the oldest and most **prestigious** races in the world. The course is grueling, full of rolling hills as it winds its way through small towns before reaching downtown Boston. The race always draws some of the world's best runners, who must meet a **qualifying** time before running the race.



Alberto, left, wins the 86th annual Boston Marathon—two seconds ahead of Dick Beardsley, right.

The 1982 Boston Marathon is sometimes called “The Duel in the Sun” because of the intense battle between Alberto Salazar and Dick Beardsley in the blazing heat. Dick wasn’t nearly as well known as Alberto. He ran the two-mile in high school almost a minute slower than Alberto did and dropped out of college to manage a dairy farm. Then one day, after reading a magazine article about training for the 1980 U.S. Olympic Marathon Trials, Dick chose to start running again. He ran a 2:21:54 and qualified for the trials by two seconds. At the trials, he clocked a 2:16:01 but didn’t make the Olympic team. After coming so close, he began training full-time to make the 1984 Olympic marathon team. The Boston Marathon took place in the middle of that training.

When Dick and Alberto toed the line that day, Alberto was expected to win because he had set the world record just a few months earlier in New York. But Dick pushed Alberto to his limit. The two traded the lead throughout the entire 26.2 miles. With five miles to go, Dick held the lead, but with a mile to go, Alberto took it. Then, with a quarter of a mile left, Dick surged. The crowds went wild. With 100 meters left, Dick pulled even. The noise was deafening. Then Alberto looked over. The two locked eyes. And Alberto kicked it in, outrunning Dick by two seconds, finishing in 2:08:52, a new course record. The two were completely exhausted. Alberto had never been pushed like that before. He had to be transported to the emergency room afterward because he was so **dehydrated**. Even though the following year Alberto won the New York City Marathon for the third straight time, he was never the same. It was the beginning of his decline.



Alberto raises Dick's arm.

New Challenges

The Boston duel had taken a toll on his body. Alberto was unable to run as fast as he had before. At the 1984 Summer Olympics, he was predicted



Despite Alberto's 15th place finish, the 1984 U.S. Olympic track and field team did well.

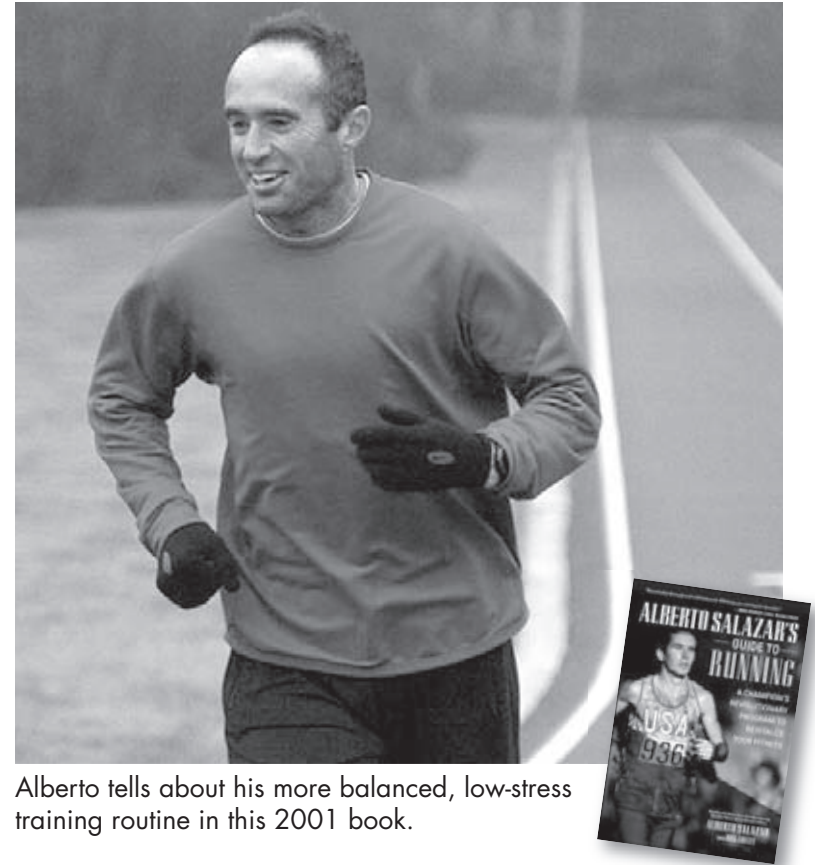
to win the marathon, if not medal, but only finished 15th in 2:14:19. He began to train harder—too hard. Instead of running 70 miles a week (10 miles a day), he'd run 140. If he still was not satisfied with his performance, he'd run 200 miles a week—more than a marathon each day. His body just couldn't keep pace with his ambition to be the fastest long-distance runner in the world.

His **immune system** failed, bringing about sudden and frequent illness. Then came a series of injuries. By 1990, his body had completely broken down, and he wasn't even able to jog anymore. Alberto thought he might never run again. Suddenly, what had brought him so much joy as a kid and fame throughout high school, college, and his adult career was now gone. He became deeply **depressed**.

For the next several years, Alberto struggled—physically, mentally, and emotionally. What pulled him slowly out of depression was an important **realization**: he needed to listen to his body. For so long, his body had responded positively to the amount of **abuse** it suffered from his training routine, and after achieving so many feats from that training style—successes that no one else in the world had achieved before—a feeling that his body was invincible had seeped into his mind. It was only a matter of time before his body broke down, but having pushed it for so long left him deaf to his body's signs (illness) and screams (injuries) for rest. Thus, when it finally shut down in order to heal and recover from the pounding it had endured, Alberto realized the grim consequences of his more-must-be-better training **theories**.



Alberto pushed his body harder than ever to win the 1982 Boston Marathon.



Alberto tells about his more balanced, low-stress training routine in this 2001 book.

Alberto **surrendered** and gave his body a well-deserved rest. His recovery was very slow but steady, and eventually his legs came back. He considered running again, but hesitated. He wanted to succeed in whatever race he chose to run, yet he didn't want to rely on his old training style. He decided to trust his new point of view on running: to create a relationship with his body so that it would respond when he listened to it and not when he abused it.

Not Finished

He began running again. He chose to train for a new distance—the ultra-marathon. He hoped for success similar to what he experienced just after college with winning his first four marathons, a distance he had never run before. **Miraculously**, he got back in shape and in 1994 announced that he would run the Comrades Marathon, a 56-mile test of endurance through South Africa. Again sports reporters wrote him off, just like they did when Alberto announced the time he would secure when running his first marathon fresh out of college. And just like before, he was victorious. Now Alberto was ready for other new challenges.



Alberto, right, coached Dan Brown, who ran the marathon for the 2004 U.S. Olympic team.

Alberto lives in Oregon with his wife and three children. He's spent the past several years training kids and young athletes for Nike, using a more balanced style developed from his experiences over the years. He suffered a heart attack while walking with some of those young **athletes**, but recovered fully thanks to the quick actions of several individuals. A family history of heart disease is something even a healthy runner cannot escape.

Alberto has agreed to continue training the five athletes under his guidance, but no others. Many of the runners who have followed his training advice have been highly successful. Most of them run the mile very quickly—well under five minutes.



Alberto currently coaches Adam Goucher, left, and Galen Rupp, right.

Glossary

abuse (<i>n.</i>)	the physical or psychological mistreatment of a living thing (p. 15)
arduous (<i>adj.</i>)	very hard; requiring continual effort or work (p. 4)
athletes (<i>n.</i>)	people trained in sports, games, or other activities that require strength, speed, and skill (p. 18)
debut (<i>n.</i>)	the first appearance of a performance in public (p. 10)
dehydrated (<i>v.</i>)	suffering a dangerous lack of water (p. 13)
depressed (<i>v.</i>)	to experience a state of unhappiness and hopelessness (p. 14)
fatigue (<i>n.</i>)	great tiredness or weariness from mental and/or physical activity (p. 8)
immune system (<i>n.</i>)	a collection of cells and organs in the human body that protect against disease-causing germs (p. 14)
intimidated (<i>v.</i>)	to be frightened or overwhelmed (p. 6)

miraculously (<i>adv.</i>)	in a way that seems performed by or involved with a supernatural power (p. 17)
phenomenon (<i>n.</i>)	an observable event or occurrence (p. 7)
prestigious (<i>adj.</i>)	having honor, respect, or high status (p. 11)
qualifying (<i>adj.</i>)	showing a minimum ability in a preliminary contest (p. 11)
realization (<i>n.</i>)	the result of understanding something clearly (p. 15)
surrendered (<i>v.</i>)	to have given up or admitted defeat; to submit to the authority of an opponent (p. 16)
theories (<i>n.</i>)	possible explanations (p. 15)

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Reading a-z

[illegible]

SKILL: RETELL

Name _____

Instructions: Read the sentences below and decide if they contain dashes or hyphens. Then write *D* for *dash* or *H* for *hyphen* on the line to the right of the sentence. If the sentence does contain a dash, explain how it is used (to clarify information or to add a thought) on the line below the sentence.

1. He could run 26, five-minute miles, all in a row, without stopping. _____

2. It wasn't easy--and it came with consequences. _____

3. Alberto quickly became the fastest runner in the school--and the state. _____

4. He trained with the Greater Boston Track Club--an elite running group. _____

5. It wasn't until his post-college years that Alberto really shined. _____

6. His body couldn't keep pace with his ambition to be the fastest long-distance runner in the world. _____

7. After achieving so many feats from that training style--successes that no one else in the world had achieved before--a feeling that his body was invincible had seeped into his mind. _____

8. Alberto surrendered and gave his body a well-deserved rest. _____

9. He announced that he would run the Comrades Marathon, a 53-mile test of endurance through South Africa. _____

10. Thanks to Alberto's training advice, most of them run the mile very quickly--well under five minutes. _____

Name _____

Instructions: Match words from the left-hand column with words from the right-hand column to create compound words. Write the compound words you created on the lines at the bottom of the page. Then use each word in a sentence on the back of this worksheet.

back

ache

class

hill

down

line

head

mate

hill

out

life

rise

some

self

sun

side

with

thing

your

time



Electric Cars: History and Future

A Reading A-Z Level W Leveled Reader

Word Count: 1,817

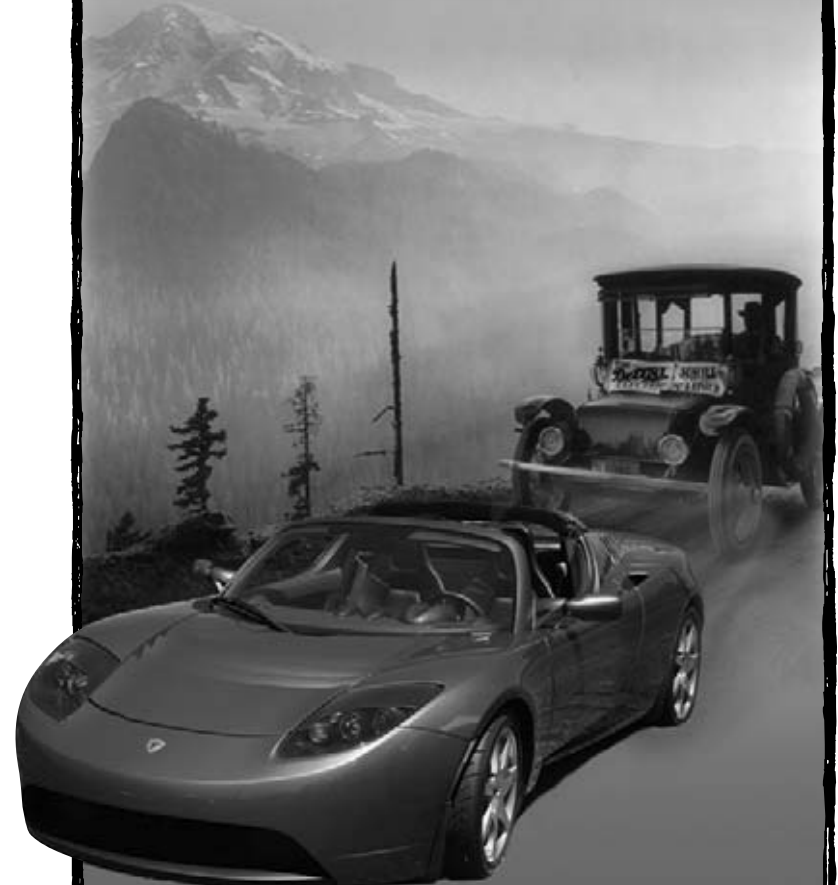



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Electric Cars: History and Future



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Front cover: (background) A Detroit Electric car travels from Seattle to Mt. Rainer in Washington State in 1919. (foreground) A 2008 Tesla Roadster, an all-electric high-performance sports car

Back cover: A single-passenger electric car called a Sparrow leads an Earth Day parade.

Title page: Mitsubishi's electric car called the iMiev Sport

Table of Contents: A Japanese electric vehicle maker, Axle Co., developed an electric motorcycle, the EV-X7, which can go 112 miles on one charge.

Electric Cars: History and Future
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Teens get on a school bus in Miami, Florida.

Stuck in Traffic

You grab your lunch and your backpack, and then head out the door. Before you see it rounding the corner and turning down your street, you hear the rumble of its engine. It's the school bus. The other kids on your block are already waiting at the bus stop. You run and get in line just as the bus is pulling up.

As you wait for your schoolmates to board ahead of you, you feel the heat from the **exhaust** warming your legs, and taste the fumes as they enter your nose and mouth. You finally climb aboard, find your favorite seat, and glance out the window as the bus accelerates from the curb.

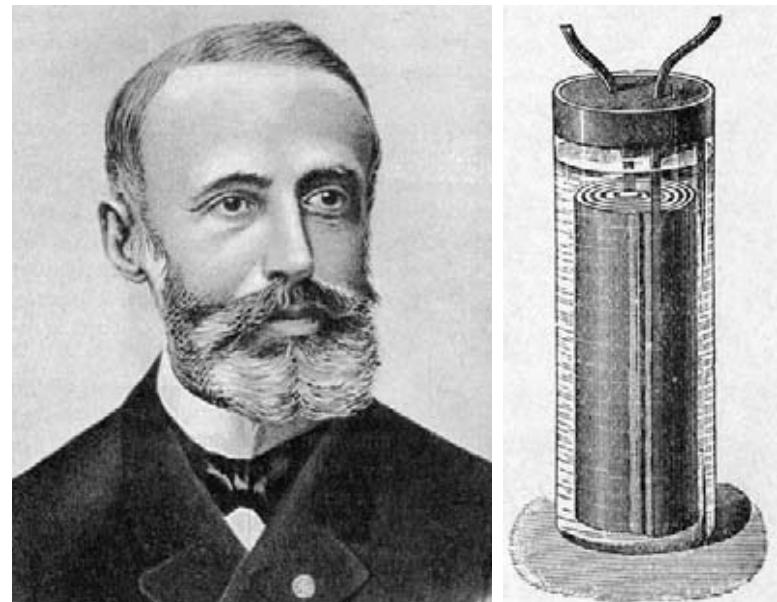
It seems as though only a moment has passed before the bus stops. Taking a look out the window you begin to understand why. Cars and trucks and motorcycles are everywhere, but none of them are moving. You're in a traffic jam. The noise is so loud that you cannot hear the kid across from you. You wonder when the racket will end. Surprisingly, smelly, noisy traffic could have ended a long time ago, if the invention of the electric car had gained more popularity.



School buses make their way through traffic in Toronto, Ontario.

What Is an Electric Car?

Electric cars began their life in the 1830s with a man name Robert Anderson of Scotland. He invented the first electric carriage. A fellow Scotsman, Robert Davidson, and an American, Thomas Davenport, created electric vehicles in 1842 that used electric cells as a power source. These cells could not be recharged, which meant the power source had to be replaced often. Two Frenchmen, Gaston Planté in 1865, and Camille Faure in 1881, created and improved upon a power source that had better storage capacity and was rechargeable—the lead-acid battery.



Gaston Planté, a French physicist, and his lead-acid battery



Jenatzy, a famous race car driver, reached speeds above 100 mph (160 kph) in this electric car in 1899.

The lead-acid battery was a huge **breakthrough** and is still used in electric vehicles today. Lead-acid batteries are made using sulfuric acid and lead. When the acid eats away at the lead, a **chemical reaction** occurs and an electric charge is created. This charge powers the motor until the battery needs to be recharged. With the invention of the lead-acid battery, the popularity of electric cars increased.

Early Electric Cars

For several years, France and Great Britain led the world in the development of electric vehicles. The United States did not join in until 1891 when A. L. Ryker built an electric tricycle and William Morrison built a six-passenger electric wagon. Suddenly, America was hooked. Many early

electric prototypes were created. In 1897, the city of New York bought a fleet of electric taxis from the Electric Carriage and Wagon Company of Philadelphia. The taxis looked almost like horse carriages, without the

A Carriage for City Use



Run by electricity

BUFFALO STANHOPE

Price, \$1650

Will readily make 50 miles on one charge of battery at highest rate of speed (17 miles per hour), on fairly level asphalt or good paved streets. Highest quality of workmanship and materials.

Buffalo Electric Carriage Co.

NEW YORK BRANCH: 400 Military Road
941-943 8th Ave., Cor. 56th St. Buffalo, N. Y.

A 1903 advertisement

horse, and cost nearly \$2,000 each, which would be at least \$50,000 today.

By Steam, Electricity, or Gas

By the beginning of the twentieth century, the popularity of cars in America had increased greatly. More and more people were moving to cities and wanted greater **mobility**. Ambitious and competitive inventors responded quickly to the demand by embracing different technology and devising many new and original ways of powering vehicles. This led to the invention of cars powered by steam and gasoline, in addition to electric cars.

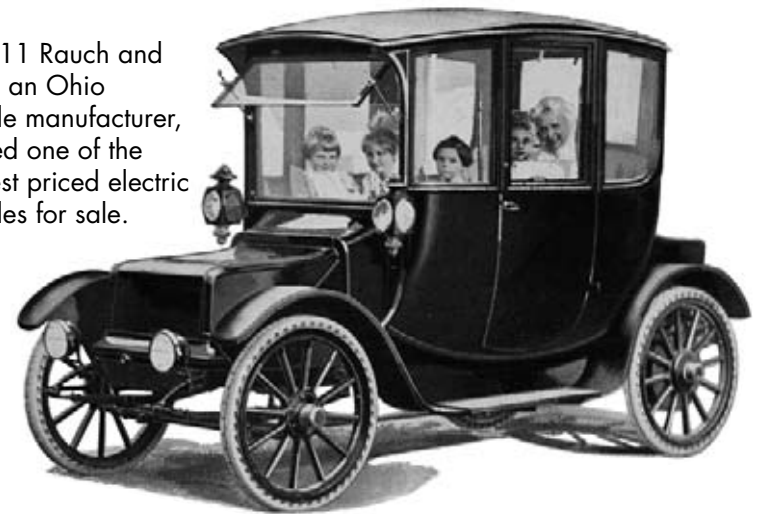
Sales of electric cars soared in 1899 and 1900 mainly because their competitors lacked what electric cars offered. Electric cars did not shake like gasoline cars, and their motors did not produce the **pungent** smell and loud noise that gasoline cars did. Changing gears on gasoline cars also proved to be a **nuisance**, and drivers were often seen wrestling with the gear shifter. Electric and steam vehicles did not require gears to be shifted. Steam cars, however, took a long time to start, sometimes as much as 45 minutes, especially on colder mornings. Gasoline cars also took time to start and required drivers to turn a hand crank.



Range, or the distance traveled, was a problem with these early cars—steam cars could only travel a short distance before needing more water. Electric cars had the advantage because they could travel farther than steam cars on a single charge. At that time, the best roads were in cities, which means that most travel was local. This situation made electric cars popular because they were able to ride smoothly and quietly for short distances.

Standard electric cars cost slightly less than \$1,000. Electric-vehicle manufacturers, however, wanted to reach more **prosperous** consumers and had designers create massive, ornate carriages with **flamboyant** interiors made from expensive materials, which bumped up the price to almost \$3,000 by 1910. This decision on affordability would haunt the electric car for years to come.

In 1911 Rauch and Lang, an Ohio vehicle manufacturer, offered one of the highest priced electric vehicles for sale.



The Lohner Porsche
'Mixte' of 1900



Do You Know?

Hybrid cars were also invented a little more than a hundred years ago. A car is called a hybrid when it runs on two different types of fuel, such as electricity and gas. Ferdinand Porsche invented the first hybrid car in Germany in 1898. His design used a gasoline engine to spin generators that produced electricity, which was sent to the electric motors that powered the car.

The Decline of the Electric Car

After the initial surge in popularity of electric vehicles for short, in-town trips, the **production** and sales of electric cars dropped rapidly; but it was not just the high price tag that caused the decline.

By the 1920s, U.S. cities had expanded their road systems so that motorists could travel between cities on good roads. This change brought about the need for vehicles that could travel greater distances like the gasoline car.

An important breakthrough was the invention by Charles Kettering of the electric starter. The starter used electric power and **eliminated** the need for the troublesome hand crank gasoline cars needed to start. Around the same time, oil



Discovery of oil in Texas meant cows began sharing fields with oil rigs.

was discovered in Texas, which made gasoline easier and cheaper to produce and therefore, much more affordable to the average driver.



In 1973 a gas shortage kept many cars idle and others waiting in long lines to purchase what gas was available.

Eventually, Henry Ford's assembly lines allowed the mass production of gasoline cars. Such high-volume production meant that Ford could sell his vehicles cheaply—to begin with, between \$500 and \$1,000. Gasoline cars became cheaper and cheaper to manufacture and sell. At one point in 1912, an electric car with its ornate designs sold for about \$1,750, while a gasoline car went for about \$600.

By 1935, electric vehicles were almost extinct and would not be built again until the 1960s when people learned how high a toll gasoline cars took on the **environment**. The constant release of harmful gases by vehicles prompted Americans to demand more environmentally friendly vehicles. Consumers also wanted **alternative** fuels to gasoline, and to rely, or depend, less on foreign oil.

The Resurgence

In the late 1960s, a company called Battronic created an electric truck that could carry 2,500 pounds at 25 mph. General Electric needed utility vehicles that could move short distances inside its plants and carry a considerable amount of weight. So in the mid-1970s, GE asked Battronic to manufacture 175 electric vans and 20 electric buses. Seeing that there was interest again in electric vehicles, Sebring-Vanguard built approximately 2,000 CitiCars. These electric cars could travel 55 miles on one charge and go as fast as 44 mph.



In 2002, the London Metropolitan Police used two electric cars with a range of 53 miles and a top speed of 56 mph.

The Elcar Corporation followed by building the Elcar, which went slightly faster (45 mph) and a bit farther (60 miles) than the CitiCar. In 1975, the United States Postal Service

saw the potential of electric vehicles and ordered a trial of 350 electric delivery jeeps from the American Motor Company. These jeeps had a top speed of 50 mph, but could only go 40 miles before needing a charge.

In 1990 and 1992, the U.S. government passed the Clean Air Act Amendment and U.S. Energy Policy Act. In addition, a few states created policies to reduce toxic **emissions**. These laws restricted the emissions that cars could put into the atmosphere and put limits on the amount of gasoline that could be used. As a result, car companies worked together with the U.S. Department of Energy to convert some gasoline cars, like the Chevrolet S-10 pickup truck and Geo Metro, to electric cars.

Shortly thereafter, other automobile manufacturers created their own electric cars. General Motors produced the EV1, a two-passenger sports car. It could accelerate from 0 to 50 mph in less than 7 seconds, had a top speed of 80 mph, and could travel 80 miles on one charge. Other electric cars included Toyota's RAV4 sport utility vehicle, Honda's EV Plus sedan, and Chrysler's EPIC minivan.

This driver and passenger show their support for electric vehicles like the Toyota electric RAV4.



Despite all this progress, history seemed doomed to repeat itself. Much like the situation almost

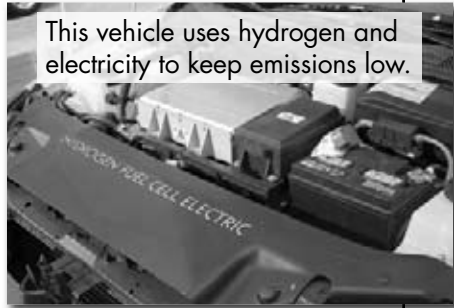
100 years earlier, this new **generation** of electric cars was too expensive for the average consumer—thirty to forty thousand dollars. By improving production **methods** and increasing the volume of cars produced, car manufacturers hoped to reduce these high prices.



A Nissan Altra EV Electric Station Wagon plugs in to recharge in 1999.

Some Pluses of Electric Cars

- + Do not produce emissions like gasoline cars
- + Motors create more or less the same horsepower no matter the speed
- + Accelerate faster and more quietly than gasoline cars
- + Excellent handling
- + Electricity available from any wall socket



Some Minuses of Electric Cars

- Batteries often contain toxic chemicals, which can pollute if disposed of improperly.
- Electricity to power cars is generated by power plants, which burn fossil fuels.



The Future of Electric Cars

The future of electric cars is always in question. On the one hand, electric cars are not produced

in the same high **volume** as gasoline cars so they are more expensive to make and purchase. On the other hand, rising gasoline prices and worsening air quality could increase the demand for electric cars.



Rising gas prices (top) helped hybrid cars like Toyota's Prius sedan (above) sell more than one million vehicles by 2007.



Solar panels on the roof help power this Subaru hybrid.

Power plants create pollution when they generate the power needed by electric cars, but inventors are already working on designing electric cars that could be powered by solar or even wind power. These cars would use the energy of the Sun or wind to charge their batteries, which eliminates the need for pollution-causing power plants. Alternative energy sources, such as the Sun and wind, are still too expensive to be a realistic fuel source, and car manufacturers are always looking at other options—for example, cars fueled by plants and even algae. Ethanol, vegetable oil, and biodiesel are alternative fuels that come from plants.

Fuel cells are another possible source of clean electric power for car engines. Fuel cells produce only two things—water and electricity. Most fuel cells create electricity by splitting hydrogen **atoms** and combining them with oxygen atoms from the air. After the electricity has been produced by this chemical reaction and used to charge a battery,



the oxygen and hydrogen join together to make water— H_2O —which is all that comes out of the car's exhaust.

Fuel cells are still not practical for everyday cars. They are expensive and need lots of hydrogen, which is hard to get, **dangerous**, and difficult to store safely in a car. Fuel cells are big and heavy, and cars sometimes only have enough



room for two seats after all the fuel cell parts are built into the car.



Ford Escape Hybrid E85, gas-electric (top); Honda FCX Concept, hydrogen fuel cell (middle); Mitsubishi Fuso Canter Eco Hybrid, diesel-electric (bottom)

Hybrid cars, which use two fuel sources for power, have been around since Ferdinand Porsche's invention more than 100 years ago. They suffer from the same problem as electric cars and some of the problems of gas cars, too. They use electricity as a primary power source, but they also use gasoline to charge their batteries. Also the gas engine kicks in to back up the electric engine when the car needs a power boost.



2009 Porsche Cayenne Hybrid Concept, a huge leap in technology from Porsche's original hybrid



This team of high school students built a hybrid vehicle that gets 1,610 miles per gallon of gas.



A letter carrier rides a Segway Human Transporter as part of a test in 2002 by the U.S. Postal Service to replace some gas vehicles.

What is the future of the electric car? Will electricity for motors come from the Sun, the wind, vegetable oil, biodiesel from plants and algae, ethanol from corn or sugar cane, hydrogen from natural gas—another fossil fuel, or from a totally new source that has not yet been discovered?

The possibilities seem endless, and the energy situation is constantly changing. Next time you're stuck in traffic on your way to school, perhaps you could start thinking about new and **efficient** ways to travel that are affordable and environmentally friendly.

Glossary

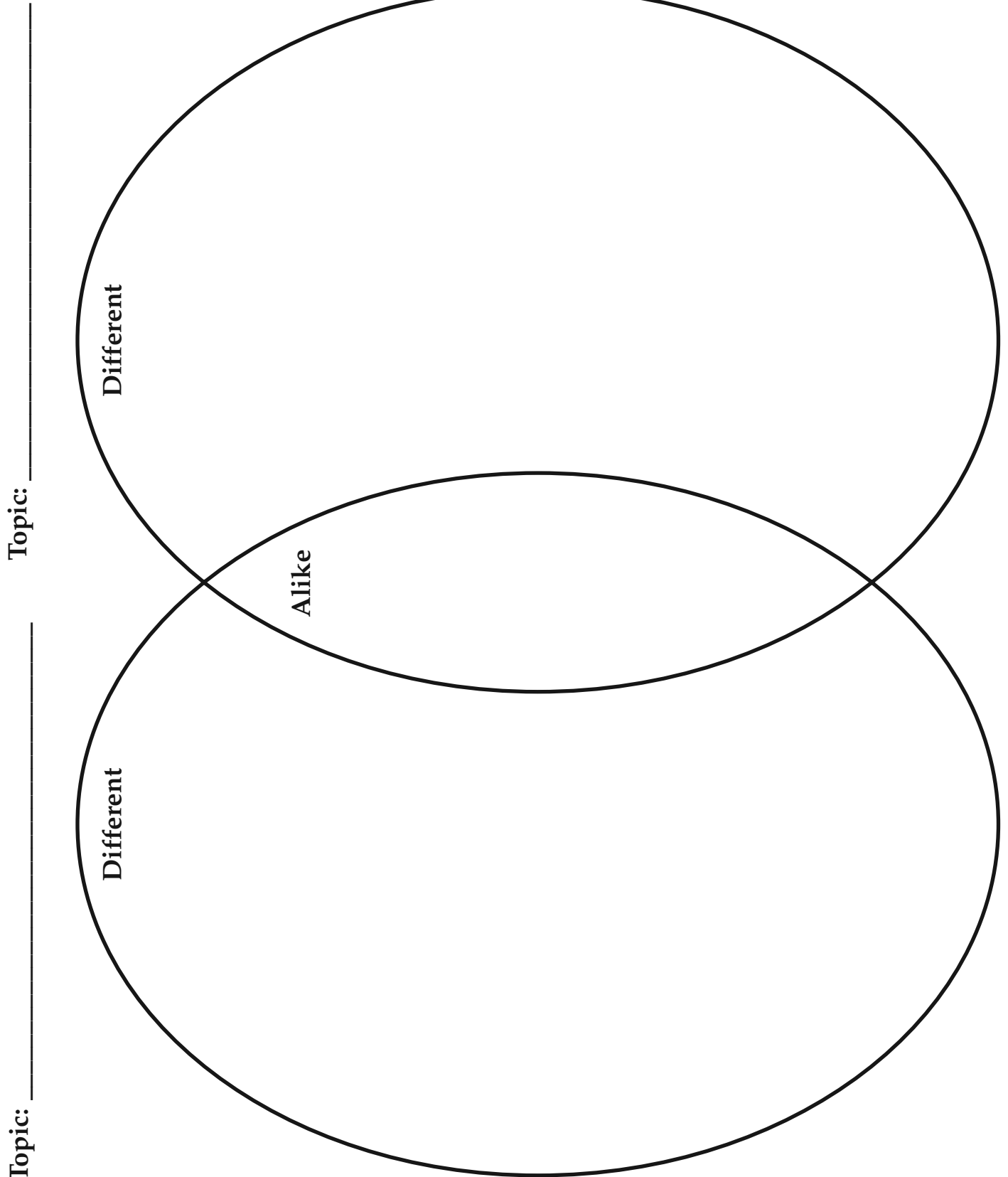
alternative (<i>adj.</i>)	available as a different choice or possibility (p. 13)
atoms (<i>n.</i>)	the smallest units of chemical elements that can still retain the properties of those elements (p. 20)
breakthrough (<i>n.</i>)	an important event or advance in knowledge that moves technology, science, medicine, etc., forward (p. 7)
chemical reaction (<i>n.</i>)	a process in which one substance, or more, is changed to another (p. 7)
dangerous (<i>adj.</i>)	having the potential to cause harm (p. 20)
efficient (<i>adj.</i>)	able to work well while producing little or no waste (p. 22)
eliminated (<i>v.</i>)	removed or taken away (p. 12)
emissions (<i>n.</i>)	things that are produced and given off as part of a process (p. 15)
environment (<i>n.</i>)	all of the conditions affecting an organism in a specific area, including plants, animals, water, soil, weather, landforms, and air (p. 13)
exhaust (<i>n.</i>)	the waste gases given off as part of a process (p. 5)

flamboyant (<i>adj.</i>)	showy or fancy; brightly colored (p. 10)
generation (<i>n.</i>)	all the people who are born and live at about the same time or are born from parents who are of the same age (p. 16)
hybrid (<i>adj.</i>)	made from a variety of different things; in automobiles, this often refers to the power sources (p. 21)
methods (<i>n.</i>)	planned or orderly ways of doing things (p. 16)
mobility (<i>n.</i>)	ability to move from place to place (p. 9)
nuisance (<i>n.</i>)	an annoying person or thing (p. 9)
production (<i>n.</i>)	the process of combining resources to make a product for sale (p. 12)
prosperous (<i>adj.</i>)	having success; well off (p. 10)
prototypes (<i>n.</i>)	original models that are used to form later things of the same type (p. 8)
pungent (<i>adj.</i>)	having a sharp flavor or smell (p. 9)
volume (<i>n.</i>)	the total quantity or amount of something (p. 18)



Name _____

Instructions: Write the two topics you are comparing. Write details that tell how the topics are different in the outer circles. Write details that tell how the topics are alike where the circles overlap.



Name _____

Instructions: Read the sentences below. Then identify the *independent clause*, the *dependent clause*, and the *subordinating conjunction*. Write them on the lines provided.

1. With the invention of the lead-acid battery, the popularity of electric cars increased.

Independent clause: _____

Dependent clause: _____

Subordinating Conjunction: _____

2. By the beginning of the twentieth century, the popularity of cars in America had increased greatly.

Independent clause: _____

Dependent clause: _____

Subordinating Conjunction: _____

3. At that time the best roads were in the local cities, which means that most travel was local.

Independent clause: _____

Dependent clause: _____

Subordinating Conjunction: _____

4. This situation made electric cars popular, because they were able to ride smoothly and quietly for short distances.

Independent clause: _____

Dependent clause: _____

Subordinating Conjunction: _____

5. Around the same time oil was discovered in Texas, which made gasoline easier and cheaper to produce, and therefore much more affordable to the average driver.

Independent clause: _____

Dependent clause: _____

Subordinating Conjunction: _____

Name _____

Instructions: Circle the hyphenated compound adjectives in the sentences below. Then underline the noun or nouns that they describe.

1. Two Frenchmen created and improved upon a power source that had better storage capacity and was rechargeable—the lead-acid battery.
2. The lead-acid battery was a huge breakthrough and is still used in electric vehicles today.
3. William Morrison built a six-passenger electric wagon.
4. Electric-vehicle manufacturers, however, wanted to reach more prosperous consumers.
5. After the initial surge in popularity of the electric vehicles for short, in-town trips, the production and sales of electric cars dropped rapidly.
6. Such high-volume production meant that Ford could sell his vehicles cheaply—to begin with, between \$500 and \$1000.
7. As a result, car companies worked together with the U.S. Department of Energy to convert some gasoline cars, like the Chevrolet S-10 pickup truck and Geo Metro, to electric cars.
8. General Motors produced the EV1, a two-passenger sports car.



Earthquakes, Volcanoes, and Tsunamis

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Word Count: 1,979



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Earthquakes, Volcanoes, and Tsunamis

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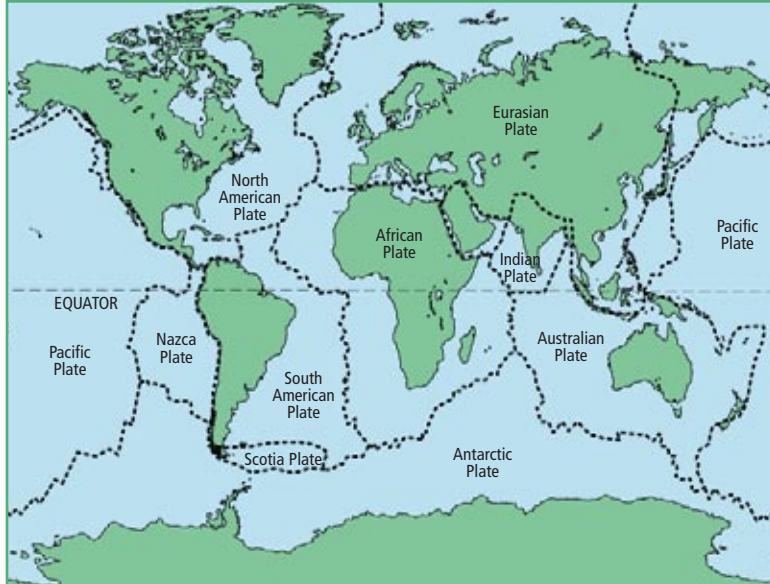
Smoke rises from what seems to be a peaceful volcano.

Introduction

We usually think of the ground and the ocean as stable and peaceful things. The ground lies quietly beneath our feet, and the ocean laps gently against the shore. But forces deep within the earth can suddenly be unleashed, destroying that peacefulness. These forces cause the violent shakings of **earthquakes**; the explosions of ash, gases, and hot rocks of **volcanoes**; and the huge waves of **tsunamis** (tsoo-NAM-ees). In this book, you will read about these amazing events and the underlying forces that cause them.

Deep Within the Earth

Beneath the soil, rock, and water on the surface of our planet, the earth is constantly changing. The top layer of Earth is made of giant pieces of rock, like the pieces of a puzzle. These giant pieces of rock, called **tectonic plates**, make up the continents and ocean floors. There are fourteen major tectonic plates and many smaller plates that make up the outermost layer of the Earth's crust. These plates are around 100 km (60 miles) thick. Where the edges of the plates come together, there are often cracks and gaps, called **faults**. Most of the world's earthquakes and volcanic activity occur near the faults along the edges of the tectonic plates.



The dotted lines show the edges of the tectonic plates.

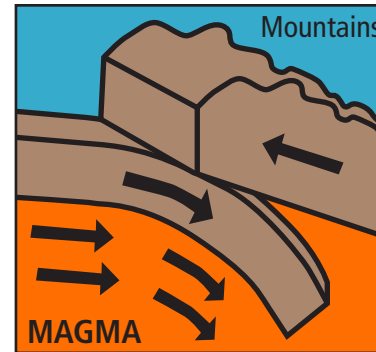


Fig. 1

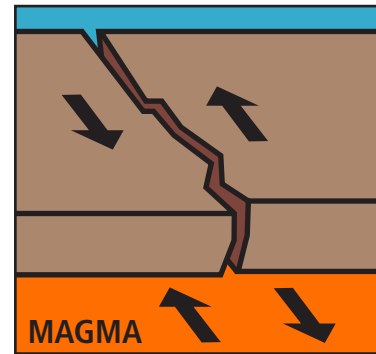


Fig. 2

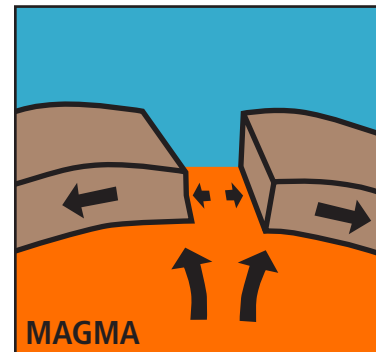


Fig. 3

Underneath the plates, the earth is very hot, with normal temperatures of 700°C to 1300°C (1,292°F to 2,372°F). It is so hot that rock melts into liquid **magma**. The plates float on top of the underlying magma. The magma is always moving, and as it moves it carries the plates around with it. Tectonic plates normally move at speeds of 0.65 to 8.50 centimeters (0.25 to 3.35 inches) per year.

At the edges of the moving plates, three different things can happen. If the plates are moving against each other, one plate slides over or under the other plate (Fig. 1). If the plates are moving past each other, the edges of the plates grind together (Fig. 2). And if the plates are moving apart, they make a gap where magma seeps out (Fig. 3).



Earthquakes can damage or even destroy buildings.

Earthquakes: Terrible Trembling

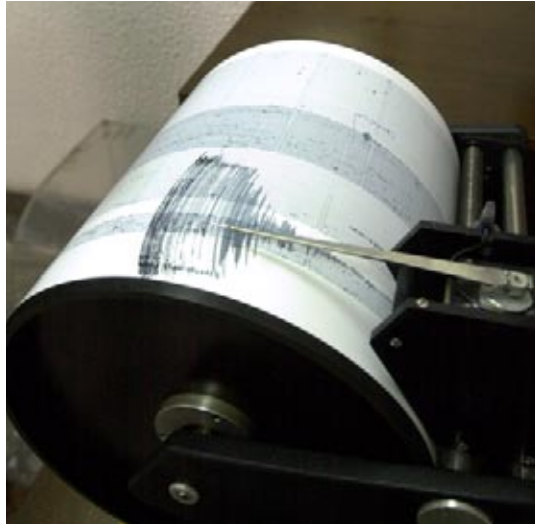
A lot of things can happen along the edges of the plates. The plates usually move very slowly. But sometimes large pieces of the plates get caught on each other. The plates keep trying to move, but these large blocks of rock hold them back. The pressure and energy build up. Then, suddenly, the rocks give way, releasing all that pressure and energy. The plates jerk forward, and the ground shakes. Far above, people feel an earthquake.

Some earthquakes are small and harmless. In a small earthquake, the ground shakes a little, causing some hanging objects to swing. Tree branches sway, as if there were a gentle breeze. Some earthquakes are so small that we do not even notice them. Small earthquakes happen very often in certain parts of the world like California and Alaska in the United States, as well as in other countries like Chile, Greece, and Japan. But sometimes the shaking is so strong that buildings crumble, bridges collapse, and large cracks open in the ground.



The ground here was ripped open by an earthquake.

We measure the strength of earthquakes on an instrument called a seismograph (SIZE-moh-graf). Each earthquake is given a number depending on its strength.



A seismograph

The numbers are from the **Richter** (RICK-ter) **scale**. You can look at the chart on the next page to learn what the different strengths of earthquakes feel like.

For each number on the Richter scale, an earthquake is ten times as strong as the previous number. A 6.0 earthquake is ten times as strong as a 5.0 earthquake. It is one hundred times as strong as a 4.0 earthquake! The largest earthquake ever recorded measured 9.5 on the Richter scale. It occurred on the coast of Chile in South America. Scientists are still learning about these dangerous events. One day, they may be able to warn people before earthquakes occur.

The Richter Scale

- 1 People cannot feel the earthquake—only sensitive instruments can detect it.
- 2 People usually do not feel it; some people in tall buildings may sense a slight swaying.
- 3 Many people near the origin of the earthquake notice the shaking. No damage occurs.
- 4 People at the origin of the quake definitely feel it. Hanging objects sway. Water sloshes in swimming pools. Some weak buildings may be damaged.
- 5 Felt over a wider area. Usually lots of damage to weak buildings at and around center. Some damage to strong buildings.
- 6 Lots of damage to weak buildings; some damage to strong buildings. Damage can spread over 160 kilometers (100 mi.).
- 7 A very major earthquake. Most buildings at the center are destroyed. Cracks form in the earth. Underground pipes break. Large landslides can occur.
- 8 Buildings and bridges destroyed. Large cracks appear in the ground. Large landslides.
- 9 The ground appears to move in “waves.” Entire rivers may move. Objects can be thrown into the air. Total destruction of buildings and other structures.

There is no top to the Richter scale, but the strongest earthquake ever recorded was a 9.5.

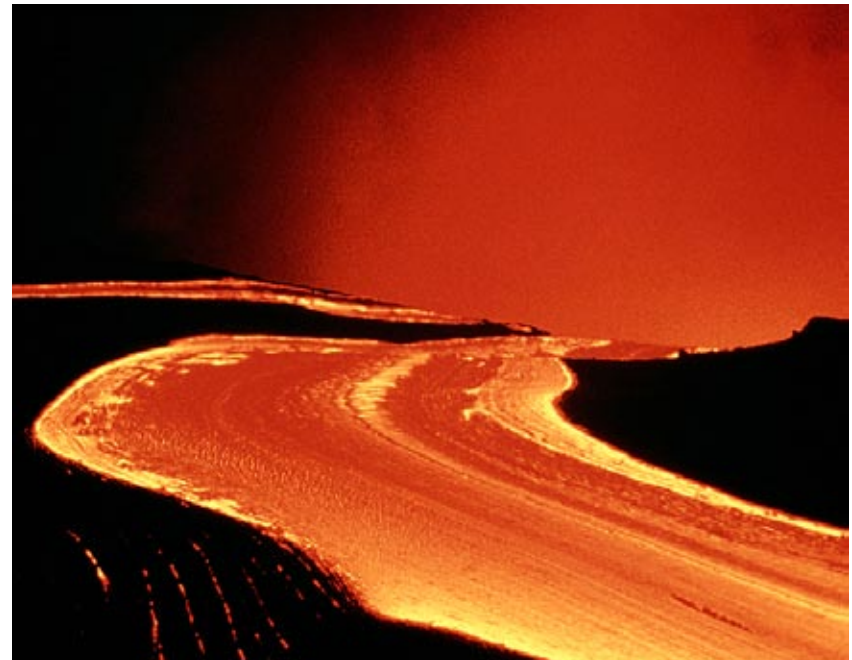


An earthquake destroyed this building.

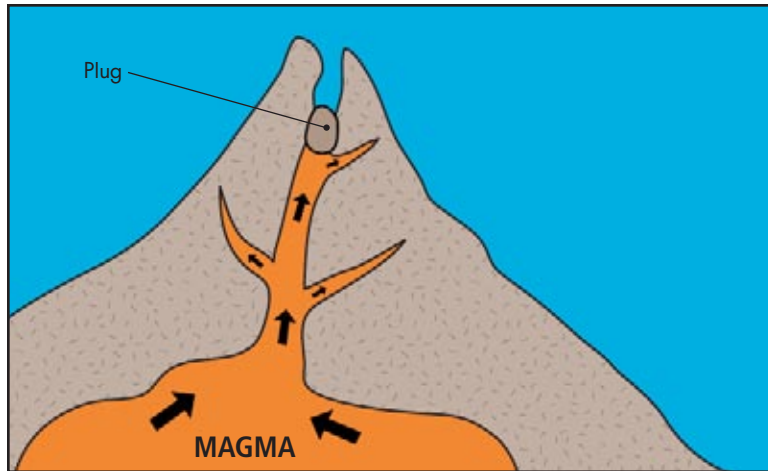
A major earthquake struck the San Francisco Bay Area of California on October 17, 1989. Known as the Loma Prieta Earthquake, it measured 6.9 to 7.1 magnitude on the Richter scale. Although the earthquake lasted only fifteen seconds, it killed more than sixty people and injured several thousand more. The earthquake also caused an estimated \$6 billion in damage to buildings, roads, bridges, and other property. This was the largest earthquake to occur on the San Andreas Fault in California since 1906, when an even more powerful earthquake and the fires that followed it destroyed much of the city of San Francisco.

Volcanoes: Enormous Explosions

A volcano occurs wherever magma from deep inside the earth comes out through a crack in the surface. Volcanoes usually happen near the edges of the tectonic plates, where there are many cracks and thin spots where the magma can leak out. When the magma pours onto the surface, it hardens, often piling up into a mountain. Sometimes, the liquid rock flows peacefully out across the land. Many volcanoes on the Hawaiian Islands act like this.

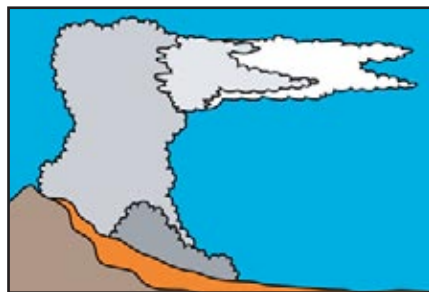


Runny liquid rock on this Hawaiian volcano flows smoothly, like a peaceful river.



Some volcanoes become plugged (above), and then they explode violently (below).

But sometimes, in very powerful volcanoes, the hot magma cools before it gets to the surface. It hardens into a solid piece of rock, plugging up the crack or hole where it had been seeping out. It acts like a plug in a bottle. The magma continues to push upward. Hot gases in the magma press against the plug. The pressure gets greater and greater. Suddenly, the volcano explodes. Huge chunks of rock burst from the volcano. Entire



mountainsides can be ripped away. Hot, poisonous gas, ash, and melted rock shoot into the sky. The volcano erupts with unbelievable power.



Many dangerous and destructive things happen during volcanic eruptions. When mountains explode, they send tons of rock rolling down their sides. These falling rocks are called **landslides**. Landslides can bury whole cities. They can block rivers, causing floods. Clouds of ash and dust rise into the air during volcanic eruptions. The ash falls to the ground like snow. The ash is so heavy that the roofs of houses can collapse under its weight. An ash cloud can spread all around the world. Large ash clouds can even block out sunlight. The temperature of the entire earth can cool down after a large volcanic eruption.



These trees were blown over by the explosion of a volcano.

A volcano can cause an explosion of extremely hot, poisonous gasses. The explosion can be so powerful that it knocks over entire forests, and so hot that it starts destructive fires. Some large volcanoes have snow and ice on top. The hot gases melt all the snow and ice at once, and the water rushes down the mountain. This large, dirt-filled flood is called a **mudslide**. A mudslide is like a liquid landslide.



Scientists gather information from a volcanic fissure.

Scientists are not yet able to predict when earthquakes will happen. But fortunately they have gotten very good at predicting when a large volcano is about to erupt. In 1991, scientists warned the people living around a volcano in the country of the Philippines that the volcano was about to erupt. Many people left the area and found safety before the huge volcano erupted.

A very large volcano called Mount St. Helens erupted in Washington State on May 18, 1980.

Mount St. Helens is part of a chain of volcanic mountains in the Cascade Mountain Range that runs throughout the Pacific Northwest where the Juan de Fuca tectonic plate meets the North American plate.

The explosive power of the volcanic eruption completely destroyed the upper portions of the mountain and flattened all the trees in the forests for miles around. The resulting cloud of ash released into the



Mount St. Helens, in Washington State, before it erupted in 1980



Mount St. Helens after it erupted

atmosphere darkened the sky over a large part of the United States. The volcanic ash fell like snow for several hours in ten states following the eruption. The Mount St. Helens eruption was

the deadliest in U.S. history, resulting in the deaths of fifty-seven people. It also destroyed homes, bridges, railroads, and highways.



Tsunamis are the largest waves in the world.

Tsunamis: Wild Waves

Tsunamis are huge waves caused by earthquakes or volcanoes. They used to be called “tidal waves.” But the word “tidal” means something to do with the ocean’s normal tides, and tsunamis have nothing to do with the tides. Tsunamis can be as high as a football field is long. They are the largest waves in the world.

The edges of the plates, where earthquakes and volcanoes often occur, usually lie near the edges of the oceans. The shaking of an earthquake or the explosion of a volcano can cause large landslides. Entire hills can collapse, and sometimes they fall into the sea and make huge waves. Earthquakes and volcanoes can also be found under the sea. Underwater earthquakes cause the sea floor to move violently. Undersea volcanoes cause explosions under the water. Both of these events create huge waves that spread across the surface of the ocean.

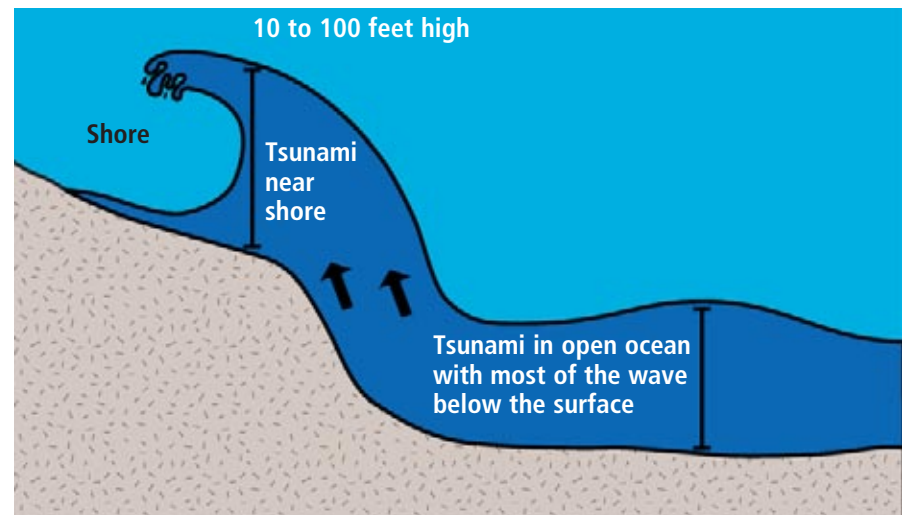


Steam rises from a volcano near the sea.

Tsunamis speed outward away from their source in all directions. A tsunami can cross an entire ocean. Tsunamis travel extremely fast—up to 320 kilometers per hour (200 mph).

In the open ocean, tsunamis may not be very high above the surface of the water, but they are very deep. As tsunamis approach land and move into shallow water, the elevated ocean floor pushes the wave upward. The wave slows to about 70 kilometers per hour (45 mph), but the ocean floor lifts it higher and higher. By the time a tsunami reaches land, it is tall enough to destroy almost anything in its path.

When a Tsunami Wave Reaches Shore



When tsunamis approach the shore, they break as giant waves.



Damage from a tsunami

The largest tsunami ever recorded came ashore along the coast of Alaska. It was taller than the world's tallest building. But this wave was in a very small bay, only a short distance from the landslide that caused it. Most tsunamis are not that high when they reach shore. They are usually between one and ten stories high. That might not sound very high, but it is hard to imagine the power of this much moving water. Most coastal towns and villages are much less than 30 meters (100 ft.) above the sea. Even a small tsunami can destroy houses, streets, and entire towns. A tsunami caused by a volcano in Indonesia killed 36,000 people in 1883.

More recently, a large tsunami struck the countries bordering the Indian Ocean in 2004. The Indian Ocean



Tsunami began when an earthquake occurred on the ocean floor near the western coast of Indonesia. The earthquake caused a ring of tsunami waves to speed outward from the point of origin, crossing hundreds and even thousands of kilometers of open ocean to strike countries far away. More than 225,000 people in eleven countries bordering the Indian Ocean were killed by the resulting waves. Satellite data analyzed after the tragedy showed that the height of the tsunami wave in the deep ocean was only 60 centimeters (2 ft.). When the waves reached the shallow waters near the beaches, however, they often grew to reach over 24 meters (78 ft.) tall. As a result of the 2004 Indian Ocean Tsunami, many countries are now working together to create a tsunami warning system for that part of the world.

Like volcanoes, tsunamis are becoming easier to predict. They usually do not hit the shore until a few minutes to a few hours after the earthquake or volcano that causes them. Scientists have instruments that detect volcanoes and earthquakes. When a large eruption or earthquake happens, scientists have time to warn people that a tsunami may be coming. Unfortunately, the system cannot warn people in time to save their homes or belongings. But they do have time to save their lives, which is the most important thing.

Conclusion

Our quiet planet occasionally turns violent. During a large earthquake, the ground shakes, destroying homes and property. In an explosive volcanic eruption, liquid rock, poisonous gases, ash, and landslides can bury cities. And tsunamis can cost billions of dollars in damage along coastlines. Scientists are trying to learn as much as they can about these violent events. As they learn more, scientists can predict volcanoes, earthquakes, and tsunamis in order to save thousands of lives.

Glossary

earthquake (<i>n.</i>)	a shaking of the ground caused by rocks moving under the surface of the earth (p. 4)
faults (<i>n.</i>)	cracks in the surface of the earth, usually around the edges of plates (p. 5)
landslides (<i>n.</i>)	when soil and rock collapse and fall down a hill or mountainside (p. 14)
magma (<i>n.</i>)	hot, liquid rock from deep inside the earth (p. 6)
mudslide (<i>n.</i>)	a dirt- and debris-filled flood of water (p. 15)
Richter scale (<i>n.</i>)	the scale that measures the strength of earthquakes (p. 9)
tectonic plates (<i>n.</i>)	the giant pieces of rock and soil that make up the surface of the earth (p. 5)
tsunamis (<i>n.</i>)	enormous ocean waves caused by earthquakes or volcanoes (p. 4)
volcanoes (<i>n.</i>)	places on the earth's surface where hot, liquid rock seeps or explodes out (p. 4)

Name _____

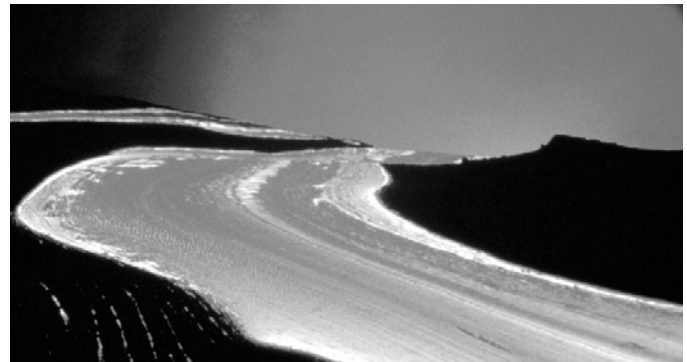
INSTRUCTIONS: In the first section, write what you already know about earthquakes, volcanoes, and tsunamis. In the second section, write what you would like to know about them. After you finish reading, fill in the third section with what you learned about earthquakes, volcanoes, and tsunamis.

<i>What I know</i>
<i>What I want to know</i>
<i>What I learned</i>

Name _____

INSTRUCTIONS: Place commas between the items in each list in the sentences below.

1. Faults can be gaps cracks or breaks in the earth's plates.
2. Earthquakes can shake buildings roads and trees.
3. Gas ash and rock are blown out of volcanoes.
4. Landslides can cause damage to rivers buildings and people.
5. Volcanoes can cause fires landslides and mudslides.
6. Tsunamis are fast large and dangerous waves.
7. A small tsunami can destroy houses streets or towns.
8. Floods fires and landslides can be caused by earthquakes.



Name _____

INSTRUCTIONS: Underline the compound word or words in each sentence. For each compound word, write each smaller word in a box and the definition of each smaller word on the line below the box.

1. Tsunamis can occur after large mudslides.

2. Landslides can cause entire mountainsides to collapse.

3. These waves can be as high as a football field is long.

4. Underwater volcanoes cause tsunamis.

5. Many volcanoes occur near coastlines.

Microbes: Friend or Foe?

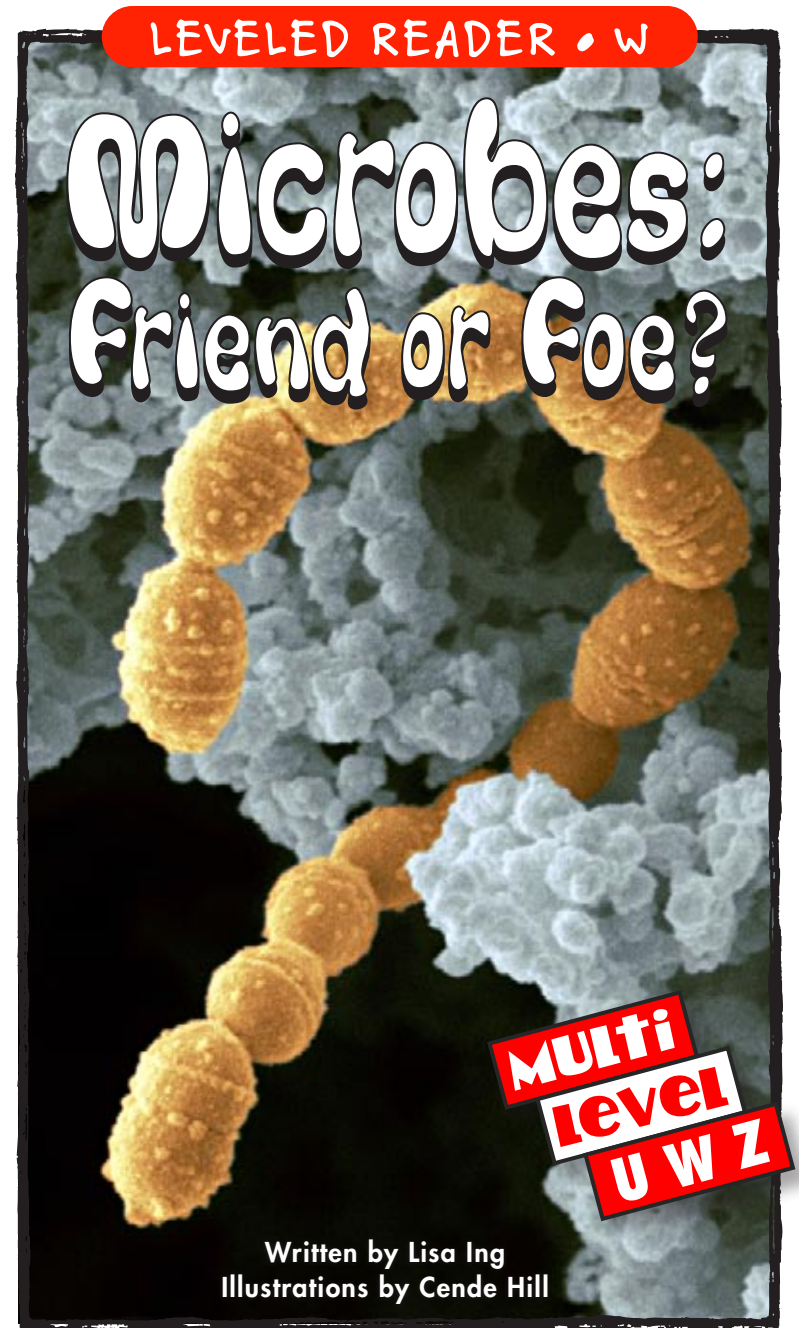
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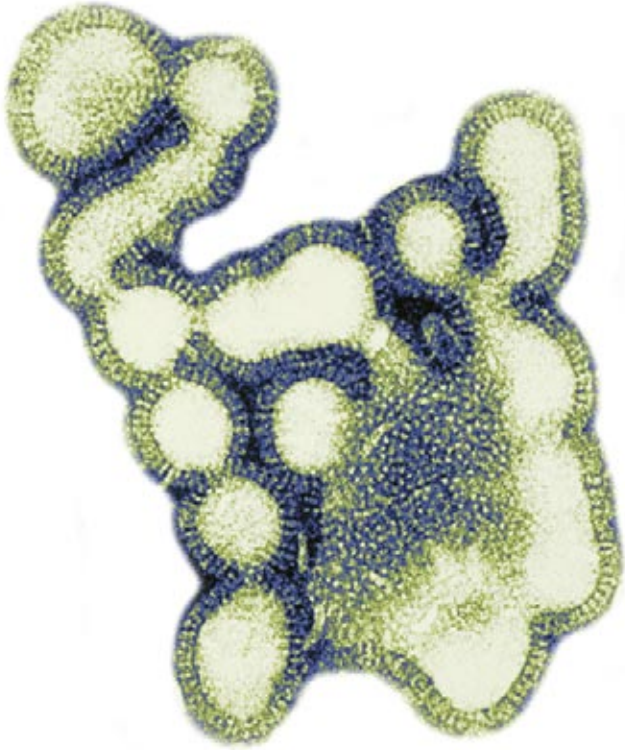
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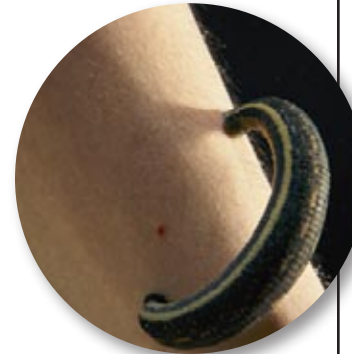
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Introduction

Achoo! You sneeze and cough all night. You're tired but can't sleep. You're too hot—then you're too cold. Your throat is sore. These are all signs, or **symptoms**, of being sick. You have “caught a bug” and developed a **disease**. It was probably caused by an **infection** from a type of tiny microbe—a *germ*.

Long ago, before scientists studied disease and health, people thought that being sick was a punishment. What had they done wrong? Had a bad witch cursed them? No one knew what really caused us to become sick, so no one knew how to prevent or cure any disease. Now we know that certain microbes, or germs, can cause diseases. But what are microbes? Where are they? Are they all bad? Can knowing about them help us prevent diseases?



Doctors used leeches in bloodletting.

Do You Know?

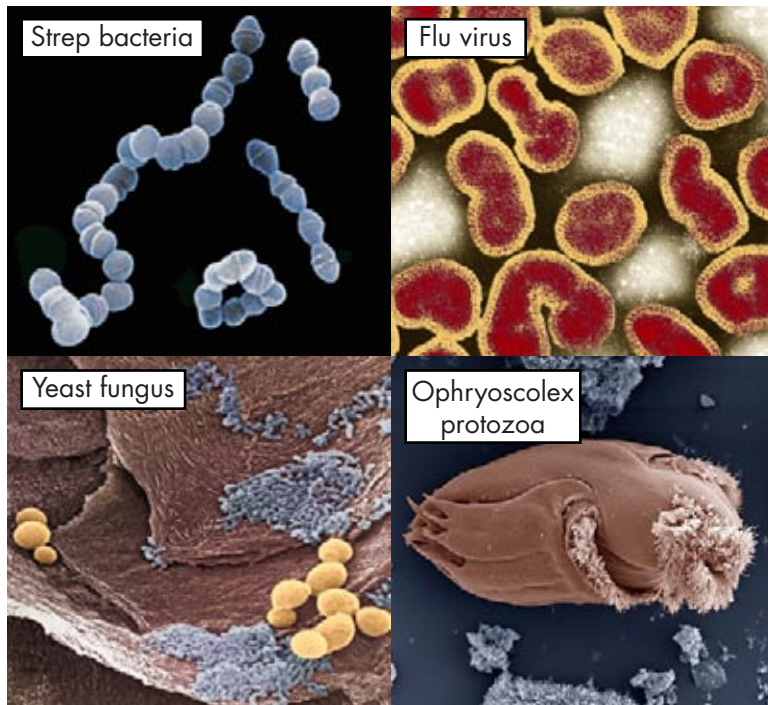
George Washington, first president of the United States, caught a throat infection in 1799. His doctors did a common treatment at the time called bloodletting. They took nine pints of blood from his body in one day. The human body holds only 12 pints of blood. Sadly, Washington died from the treatment, not the disease.

What Are Microbes?

Microbes are tiny organisms, or living creatures, that are almost invisible. They can be seen only with a powerful **microscope**. These tiny organisms exist all around us. They are in the air we breathe, on every surface we touch, on our skin and clothes, and inside our bodies. They are everywhere!

There are many types of microbes, both good and bad. Some microbes cause disease, but others can help to prevent or cure illnesses.

Different kinds of microbes



Louis Pasteur

Modern medicine owes a lot to Louis Pasteur (PASS-toor). He proved the Germ Theory of Disease, which states that contact with harmful microbes is the cause of disease.

Pasteur's most important discovery was that heating a sealed canister filled with food to a specific temperature for a certain length of time would kill many organisms inside. This heating process is called pasteurization. Today it is used on fresh milk and canned food.



Math Minute

To pasteurize milk, the milk is heated to 145 degrees Fahrenheit (62.8°C) for 30 minutes, or to 163 degrees Fahrenheit (72.8°C) for 15 seconds. How much quicker in seconds is it to pasteurize milk at the higher temperature?

$$1 = 3 + 5 + 2 = 10 - 4 + 10 \div 2 = 14 \times 2 - 3 = 25 - 5 - 5 \\ 2 = 17 + 3 \times 2 - 20 \div 2 - 5 \\ 1 = 3 + 5 + 2 = 10 - 4 + 10 \div 2 = 14 \times 2 - 3 = 25 - 5 - 5$$

The Immune System

The human body makes a great home for microbes. It is warm, moist, and a good source of food. Many friendly microbes live in our bodies and help us—in exchange for a nice place to live. But sometimes there are just too many of them. Or, harmful microbes enter our bodies and then multiply. Too many of either type of microbe can cause problems for our health.

Math Minute

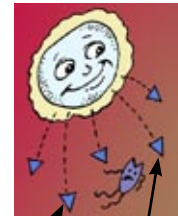
Some microbes can double their population every 20 minutes. If you start out with 1 microbe, how many microbes will you have after 4 hours?

Hint: Start with 1 microbe at 0 minutes.

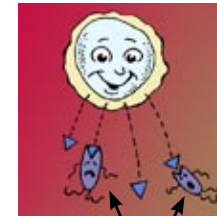
Harmful microbes can attack and damage our body's **cells**. Cells make up the parts of our body and form the immune system that protects our health. We have blood cells and bone cells, stomach cells, skin cells, and muscle cells, as well as other kinds of cells. There are trillions of cells inside of us, all working together. Cells all have important body-building and health-protecting jobs to do.

Do You Know?

One drop of blood contains between 7,000 and 25,000 white blood cells. These cells attack invading microbes in different ways. Some white blood cells produce antibodies that cancel out the microbe's chemicals, while others surround the microbe and destroy it.



antibodies



microbes



To help, we have natural defenses to keep out the troublemaking microbes. Our bodies have layers of skin that cover us completely. Microbe-hunting white blood cells travel through our blood vessels—like security guards. They destroy millions of invading microbes every day. Friendly microbes join in to help them. These strong defenses are all part of a healthy **immune system**.

The immune system knows the difference between good and bad microbes. It recognizes the ones that cause problems and remembers what defenses worked against them in the past. It fights them off if they try to come back. If you have ever had mumps, your immune system remembers—and you will probably not get sick from mumps again.

Four Groups of Microbes

Bacteria

Bacteria (back-TEER-ee-uh) are simple, single-celled organisms. Like all microbes, they are too small to be seen without a powerful microscope. There are both good and bad bacteria. There are more types of bacteria than there are types of any other organisms on Earth.

One type of good bacteria lives in our intestines. It helps us to break down and digest the food we eat. Some good bacteria also help our white blood cells kill bad bacteria.

Fun Food Fact

Several types of bacteria help change milk into yogurt and sour cream. These bacteria eat lactose, or milk sugars, and release lactic acid, which curdles the milk and makes it more solid. The lactic acid gives yogurt and sour cream a tangy, sour flavor.

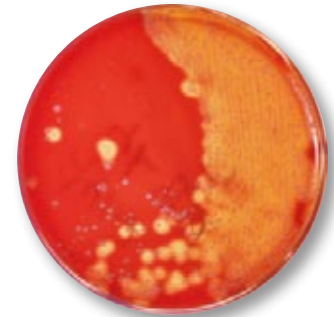


Some bacteria cause food poisoning.

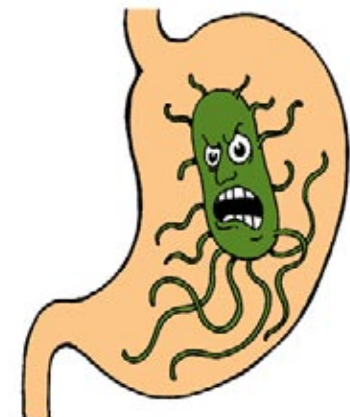
Some good bacteria help create dairy products.

Harmful bacteria cause infections like strep throat and food poisoning. Nasty strep throat bacteria can cause a painful, swollen throat, a fever, a headache, a stomachache, and swollen glands in the neck. White spots of pus appear on the back of the throat.

Some types of harmful bacteria live on, or in, many uncooked foods. They can cause food poisoning. These bacteria **invade** when we aren't careful about how we handle or cook food. Remember to wash your hands before preparing food. Meat, chicken, or pork should be rinsed off before they are cooked. Foods need to be cooked to the correct temperature to kill bacteria. Food poisoning often causes an upset stomach, vomiting, and diarrhea.



Scientists sometimes grow bacteria on purpose so that they can study them. Here, strep throat bacteria grow in a dish filled with a liquid that provides food and a safe environment.



Salmonella is the bacteria responsible for many cases of food poisoning.

Viruses

Viruses (VY-russ-es) are even smaller than bacteria. Viruses live inside the cells of people and other animals. Viruses cannot live on their own outside another living creature. Once inside, they can multiply. They can spread from cell to cell, causing an infection.

Do You Have a Common Cold or the Flu?

Symptoms	Common Cold	Flu
Headaches	No	Yes
Fever	None or Mild	High Fever, 102–104°F for days
Muscle Aches & Tiredness	Sometimes	Yes
Sore Throat	Yes	Sometimes
Runny Nose	Yes	Sometimes
Sneezing	Yes	Sometimes
Coughing	Yes	Yes
Chills	No	Yes

Viruses can make people sick. Some viruses can cause death. And a virus doesn't always play fair. A virus can easily **mutate**, or change its identity, to avoid being noticed. This ability to change makes it more difficult to find. To kill a virus, the body must destroy the cell, or cells, in which the virus is living. The flu, chicken pox, and the common cold are each caused by a virus.



Influenza virus at 295,000x magnification



Athlete's foot is caused by a fungal infection of the skin.

Fungi

In some ways, fungi (FUN-guy) are like plants, but they cannot make their own food. There are two types of fungi: many-celled, which include both edible and poisonous mushrooms; and simple, single-celled fungi, which include the yeast that makes bread rise. Many types of fungi are **parasites**. A parasite lives by absorbing the energy it needs from other living things.

Two common infections caused by harmful fungi are ringworm and athlete's foot. Ringworm causes a wormlike, red ring to appear on the skin. Athlete's foot attacks the bottom of the feet and area between the toes, causing the skin to itch, crack, and peel.

Protozoa

Protozoa (pro-toe-ZOE-uh) are tiny, single-celled organisms that often live in streams and ponds. They are food for some birds and fish. Protozoa are often found in dirty, untreated water. If protozoa get into your body, they can cause stomachaches, nausea, vomiting, and diarrhea.

One dangerous protozoa is spread by saliva from an infected mosquito. It causes a disease called malaria. When an infected mosquito bites a person, the protozoa enter the person's blood through the bite. Malaria is a serious illness that causes a high fever, delirium, and weakness. It occurs most often in hot, tropical areas. Malaria kills a million people around the world every year.



Mosquitoes can transfer diseases like malaria and West Nile virus from person to person.

How Do Microbes Spread Infection?

Germs spread easily. Many infection-causing microbes live in our body fluids. They hide in saliva, blood, and nasal mucus. These fluids transfer germs easily. If a person sneezes or coughs on us, we can pick up germs. You can also pick up germs if you handle something that has been touched and **contaminated** by an infected person.

Doorknobs are touched by dozens of people every day. If a sick person touches a doorknob after he or she blows his or her nose, microbes stay behind. The microbes travel from the runny nose, to the hand, to the doorknob. People who then touch the doorknob can pick up the germs. If they then rub their eyes, or pick up and eat a sandwich, the germs can enter their body. If a sick person sneezes, coughs, or even talks, microbes can fly into the air and infect another person.

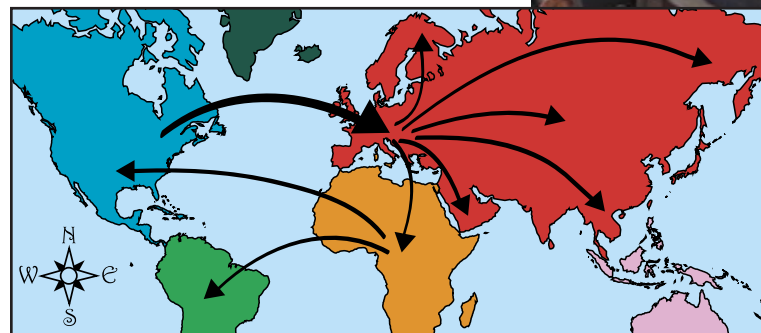
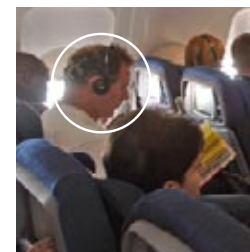
There are many ways to get sick. Some diseases can be spread through the air. We can catch germs from an unclean surface. We can eat spoiled food or drink polluted water. A few diseases can pass from an infected insect or other animal to a human. We can get rabies from infected mammals like dogs, raccoons, and

skunks. Salmonella may be on chickens, birds, fish, and reptiles. We can contract malaria and West Nile virus from infected mosquitoes, avian flu from sick birds, and Lyme disease from tick bites.

Outbreaks and Epidemics

Diseases can spread quickly. When a small group of people in the same place gets the same disease, it is called an **outbreak**. When an outbreak of disease rapidly spreads to a large number of people, it's called an **epidemic**. When an epidemic quickly spreads to infect groups of people worldwide, it is called a **pandemic**.

An outbreak of a disease is no longer expected to stay in one place. Modern transportation carries both people and their germs quickly. Airplane passengers move around the world within hours. A sick traveler can infect any person he or she encounters



during a trip. The new, infected person can start another outbreak in another place. In the United States, the Centers for Disease Control and Prevention (CDC) monitor infections around the globe because a dangerous disease in one region can threaten people worldwide.

Fighting Microbes with Vaccines

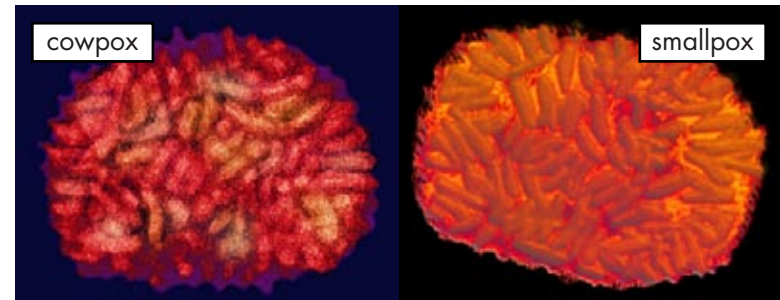
Vaccines are a way to plan ahead to prevent disease. Vaccines are strong treatments that build up our immune system's ability to recognize and fight off a disease-causing microbe. Some vaccines are chemicals that are designed to help people who have an already weakened immune system. Other vaccines are made from tiny bits of the virus or bacteria itself.

The idea of using one virus to attack another virus in order to prevent a worse disease, was first thought of about two hundred years ago in England. Dr. Edward Jenner noticed that people who had been sick with cowpox, a mild disease caught by farm workers, never got smallpox. Smallpox was one of the deadliest diseases

Vaccines can be given as shots or taken by mouth.



in the world—it killed thousands of people. Dr. Jenner realized that cowpox and smallpox must be related—like cousins from the same family. He was sure he could use the milder disease to prevent another, worse, disease. In his test, he decided to give healthy people a mild case of cowpox. Their immune systems could easily fight off the mild cowpox and learn about that type of virus. Later, if smallpox tried to invade their bodies, their immune systems would recognize the pox virus and remember how to defeat it. His idea was correct. These people did not get the deadly smallpox virus. His idea saved many thousands of lives.



Do You Know?

When Europeans and Africans carried *smallpox* microbes to the Americas, none of the Native Americans had ever been exposed to the disease. They had no immunity to it. As a result, smallpox killed millions. In South and Central America, nine out of ten people in the largest native cities died from smallpox.

Antibiotics: The Magic Bullet

Scientists discovered that some microbes naturally fight other types of microbes and kill them. They can do this without harming healthy cells or helpful microbes. These killer microbes produce medicines called **antibiotics**. When scientists first discovered antibiotics, they considered these medicines to be “magic bullets” because they would directly attack the targeted infection and leave nearby healthy cells alone.

An antibiotic medicine kills most microbes that cause a disease. But the strongest microbes sometimes survive. Often, these hard-to-kill microbes change themselves just enough to hide from the antibiotic. Other antibiotics have become overused, or misused, so microbes have developed a **resistance** to them. Scientists keep trying to produce new antibiotics to fight stronger, deadlier microbes.

Do You Know?

In 1928, Dr. Alexander Fleming discovered that a common bread mold would kill bacteria. This discovery led to the world’s first antibiotic, penicillin, which is still the world’s most widely used antibiotic.



Don’t Spread Disease

You can help to reduce the chance of a harmful microbe getting into your body and making you sick. Remember that when you are sick, it is important to stay home. Stay away from other people and rest. This helps your body fight microbes, and it also keeps you from infecting other people.

When you have a cold or a cough, always cover your mouth and nose with a tissue. Then throw away the tissue in a trash can. Don’t leave the used tissue lying around to pass those germs on to other people. If you don’t have a tissue, cover your nose and mouth with your cupped hands and then wash your hands right away. If you are sick, do not share food, cups, or plates with other people.



Germs, or harmful microbes, spread easily in crowded places.

Staying Healthy

Keep your immune system healthy

- In order to stay healthy, you must keep your immune system strong. Eat a balanced diet of nutritious foods, including fruits and vegetables, and drink lots of water. Get fresh air, exercise, and enough sleep each night.

Preparing food

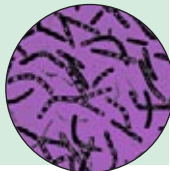
- Wash knives and cutting boards with water and soap after cutting raw meat, and never let raw meat touch cooked foods.
- Do not eat food from dented or swollen cans.
- Do not eat food that has fallen onto the floor.

Keeping clean

- The most important microbe-fighting action is staying clean with soap and water. Eighty percent of diseases are transmitted through touch because many people do not wash their hands. If everyone washed his or her hands, we could cut down the spread of disease.
- Wash your hands after you go to the bathroom, after touching animals, and before and after you make and eat food. Wash with soap for at least fifteen seconds, or as long as it takes to hum the song “Happy Birthday” twice. Rub soap lather all over your hands, even under your fingernails. Then rinse your hands and dry them on a clean towel.

Take care of your teeth

- Brush and floss your teeth to remove bits of food. Mouth bacteria cause cavities and feed on rotting food. Infections can easily get into your bloodstream through your mouth.



See a doctor regularly

- A healthy person should see a doctor once a year. Getting a regular checkup can prevent problems before they begin. Make sure you get all of your shots.

Outdoor safety

- When you go outside, do not touch wild animals. They may bite or scratch, or they may have disease-carrying bugs on them. Wear insect repellent to keep mosquitoes and ticks away when camping or hiking.
- Don't drink water that has not been purified and chlorinated.

Conclusion

Microbes live in, on, and around almost everything. Most of them are harmless, but some microbes cause disease. There are many ways to prevent diseases from spreading. Some are simple things, such as washing your hands before eating or handling food and after using the bathroom. Other efforts, such as treatments of vaccines and antibiotics, are the result of two hundred years of scientific discovery, research, and modern medicine.

Many countries, organizations, and individual doctors are coordinating their efforts to control and even **eradicate** many diseases. Even with all of this effort, we will never be able to wipe out all of the world's harmful microbes—but we can learn how to fight them and to be healthier.

Glossary

antibiotics (<i>n.</i>)	medicines made from microbes to fight infections from other microbes (p. 19)
cells (<i>n.</i>)	the smallest independently functioning units in organisms (p. 7)
contaminated (<i>adj.</i>)	covered with harmful microbes (p. 15)
disease (<i>n.</i>)	a condition that changes the way the body normally functions (p. 4)
epidemic (<i>n.</i>)	the rapid spread of a disease within a community (p. 16)
eradicate (<i>v.</i>)	completely destroy (p. 22)
immune system (<i>n.</i>)	system that moves antibodies through your body to fight infection (p. 8)
infection (<i>n.</i>)	illness caused by microbes (p. 4)
invade (<i>v.</i>)	to enter aggressively to conquer, weaken, or injure (p. 10)
microscope (<i>n.</i>)	a device used to view tiny objects (p. 5)
mutate (<i>v.</i>)	to permanently change (p. 12)
organisms (<i>n.</i>)	living things, including people, other animals, plants, and microbes (p. 5)
outbreak (<i>n.</i>)	the quick spread of a disease (p. 16)
pandemic (<i>n.</i>)	the rapid, worldwide spread of a disease (p. 16)
parasites (<i>n.</i>)	living things that take what they need to survive from other living things (p. 13)

resistance (<i>n.</i>)	the ability to fight against something (p. 19)
symptoms (<i>n.</i>)	telltale signs of an illness (p. 4)
vaccines (<i>n.</i>)	preparations containing a weak disease that teach the body to fight stronger forms of the same disease (p. 16)



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Name _____

INSTRUCTIONS: Write a vocabulary word from *Microbes Friend or Foe?* in each *Word Box*. Write a definition, a synonym, and an antonym for each word in the appropriate boxes. Then use each word in a sentence.

Synonym	Word Box	Antonym
Definition		
Sentence		

MICROBES: FRIEND OR FOE? • LEVEL W • 1

Synonym	Word Box	Antonym
Definition		
Sentence		

SKILL: CONTENT VOCABULARY

Name _____

INSTRUCTIONS: Identify and list the important information from the chapter in the *Important Information* boxes. Then use the information to create a summary in the *Summary* box.

Important Information	Important Information	Important Information	Important Information

MICROBES: FRIEND OR FOE? • LEVEL W • 2

Summary

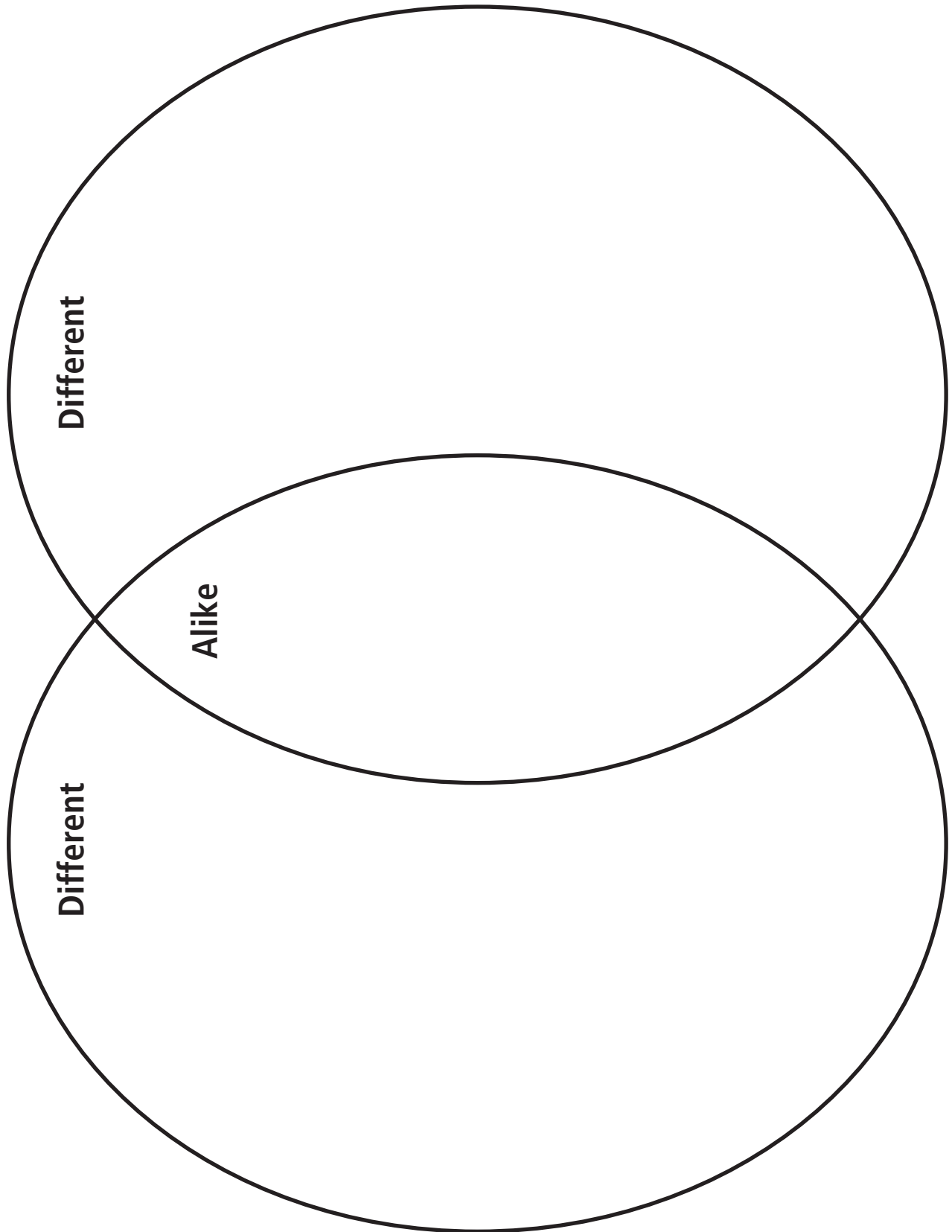
SKILL: SUMMARIZE

Name _____

INSTRUCTIONS: Use the information on pages 17 through 19 to compare and contrast vaccines and antibiotics. Write details that tell how vaccines and antibiotics are different in the outer circles. Write details that tell how they are alike where the circles overlap.

Topic: _____

Topic: _____



Name _____

INSTRUCTIONS: Read the sentences below. In each sentence, find the comparative or superlative adjective and circle it. On the line to the right, identify it by writing either *comparative* or *superlative*.

1. An antibiotic medicine kills most microbes,
but the strongest often survive. _____
2. Children's and senior citizens' immune systems
are weaker than those of healthy adults. _____
3. If a person stops taking antibiotics before finishing
the full dose, the toughest microbes will live. _____
4. Scientists keep trying to produce new antibiotics
to fight microbes that are stronger than others. _____
5. Smallpox was one of the deadliest diseases
in the world at the time. _____
6. Tiny protozoa are the simplest animals in the world. _____
7. Viruses are even smaller than bacteria. _____
8. Some organisms larger than protozoa
use the protozoa for food. _____
9. The microbes that survive will multiply
and become even stronger microbes. _____
10. When the microbes that survive multiply,
they will be deadlier than ever before. _____

Acropolis Adventure

A Reading A-Z Level W Leveled Reader

Word Count: 2,543




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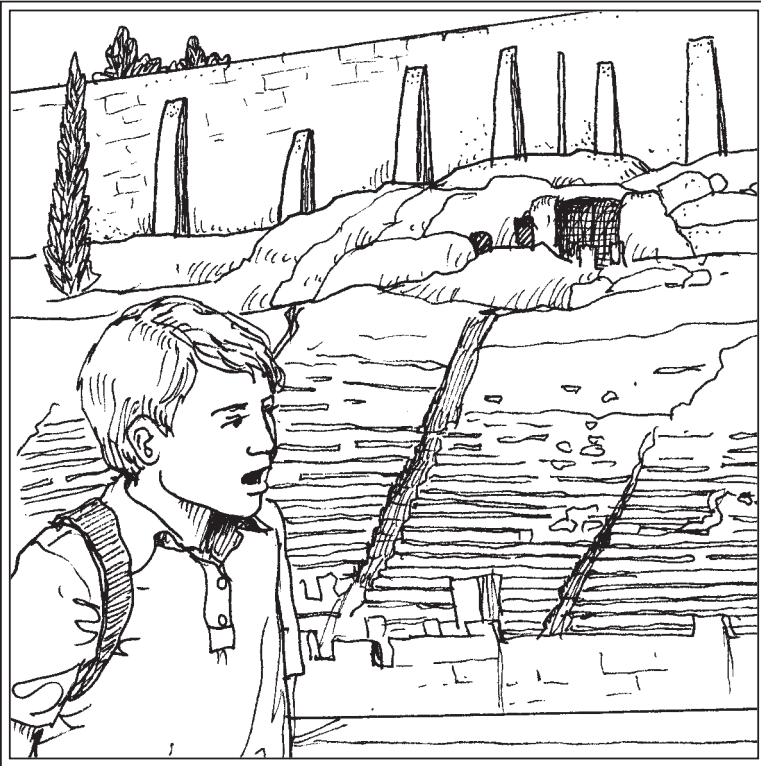
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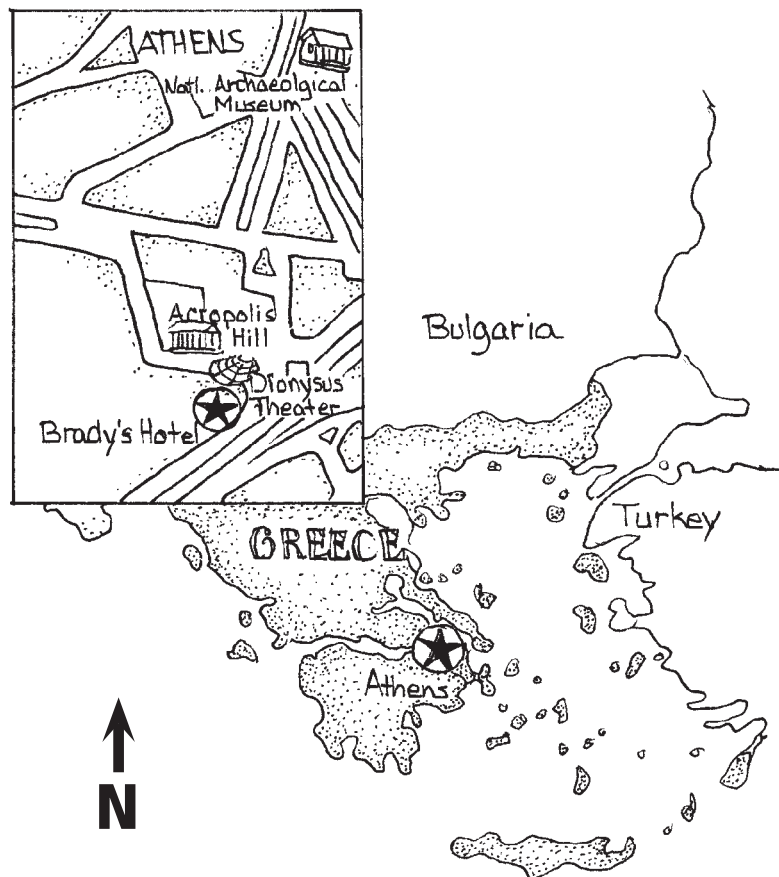


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DIMITRI THE GREEK

"You must be Brady."

Surprised, Brady stopped and looked around; he was getting jostled by the crowds of tourists streaming down the narrow stone-paved street.

"Over here, young man," the voice continued.

Brady squinted in the bright morning sunshine, struggling to find where the voice came from. He looked toward a shady sidewalk cafe on the busy street. The glaring sunlight kept him from seeing into the deep shadows created by the umbrellas.

"Yes," Brady answered timidly.

"You are Brady Phillips, son of my American friend Jonathan Phillips?" the voice questioned.

"Yeah," Brady answered a bit more surely.

"Then come and sit with me."

As Brady slowly moved into the shade, his eyes adjusted. He could make out a tall figure sitting alone at a table in the corner. The man's head was completely bald and tanned by years in the sun, but his eyes were bright and welcoming.

Even though the man was seated, Brady could tell he was tall and slender, and his clothes hung loosely on him.

"Are you Dimitri?" Brady asked.

Brady was on vacation with his parents in Greece, and they had arranged for him to meet Dimitri, an old family friend, while they spent the day visiting the **Athens** National Museum.



"Yes, I am," the man answered. "Actually, it's Dimitrious Thanapopoulous, at your service," he continued with a slight bow of his head. "But please call me Dimitri."

"So, you know my dad?" Brady asked.

"Yes, Brady. I met your father when he was just out of college and eager to experience life outside of the United States. We explored the **European** countries of Greece, Italy, France, and Spain together."

Dimitri stopped speaking and closed his eyes. A tiny smile crossed his face, and the wrinkles around his eyes deepened. "It was a glorious time. Remember, all of us older folks were once young and full of questions and energy like you," Dimitri said.

"Well, I don't have many questions," Brady answered with a shrug of his shoulders. "All this **ancient** history and learning about other countries is kind of boring."

"Boring?" Dimitri boomed, raising his eyebrows in surprise. "My friend, you are in one of the most exciting cities in the world, the birthplace of many of the ideas that make up our modern world."

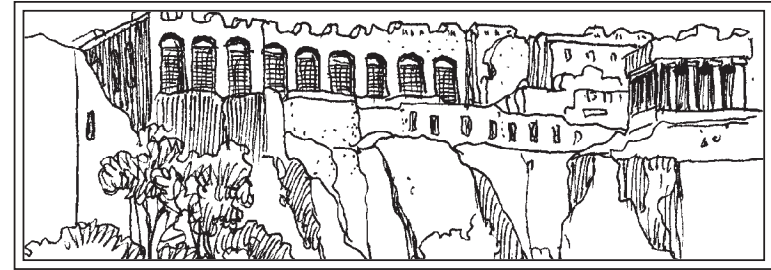
"Yeah, yeah, I've heard all that," Brady said. "But it's just a bunch of dates and names that don't mean anything to me."

"Well, that's about to change," Dimitri said, patting Brady on the shoulder. "I'm going to bring the secrets of Athens to life before your very eyes."

"I don't have much money," Brady responded, hoping maybe this would excuse him from a day of historical sightseeing.

"It's not needed," Dimitri answered. "Simply open your imagination, and I'll do the rest. What do you say?" Dimitri asked, extending a suntanned arm toward Brady for a handshake.

"Well, okay, I guess," Brady answered.



WINDING AROUND THE ACROPOLIS

Dimitri and Brady left the cafe, working their way among groups of tourists sightseeing and shopping along the winding, narrow streets of Old Athens. The pair walked toward the steep-sided hill called the Acropolis, which was Greece's most famous **landmark**. The Acropolis hill rose up and towered above the crowded streets of the city. Brady had seen the buildings on the hilltop lit up at night, glowing high above the city as if anchored in the ground like a huge cruise ship.

Before Dimitri and Brady reached the foot of the steep slope leading up to the hilltop, Dimitri steered Brady away from the crowd.

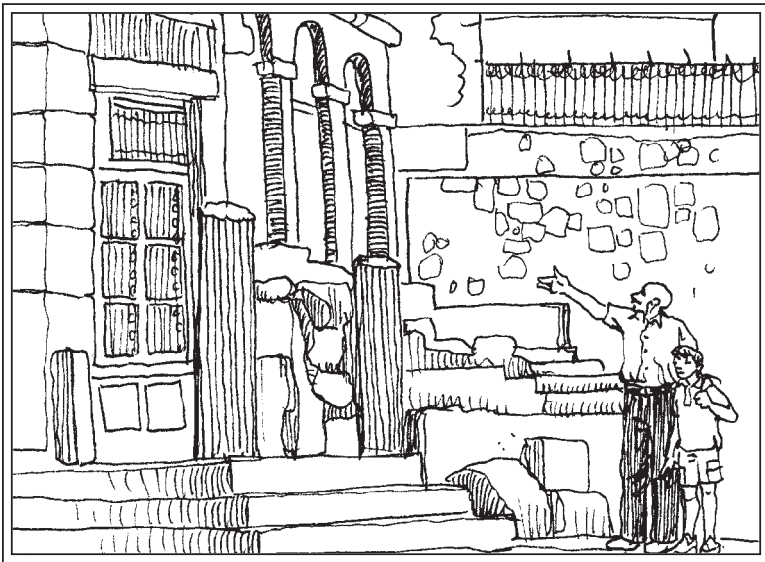
Off the street, through a rusty, iron gate stretched a flat, dusty plot of land that was dotted with marble **columns** and bits of old, stone-paved roads. A modern iron fence separated this area from the rest of Athens as if it were a private park or cemetery.

"What are we doing here?" Brady protested. Instead of answering, Dimitri led Brady toward a stone tower off to their left in a corner of the fenced area. It was a two-story-high marble **octagon** that had turned gray and rough with weather and age. At the top of each of the eight flat sides, a carved figure appeared as if floating on the wind.

"Brady, tell me what you see," Dimitri demanded quietly, pointing to the tower.

"Um, I guess I see a tower," Brady answered.

"Of course, that's obvious," Dimitri smiled. "Now look closer and tell me what you really see."



Brady shaded his eyes with his hand and focused. He noticed several small, metal rods—rusted with age—poking out from the flat sides of the tower at odd angles. Each rod rose out from one of the floating figures.

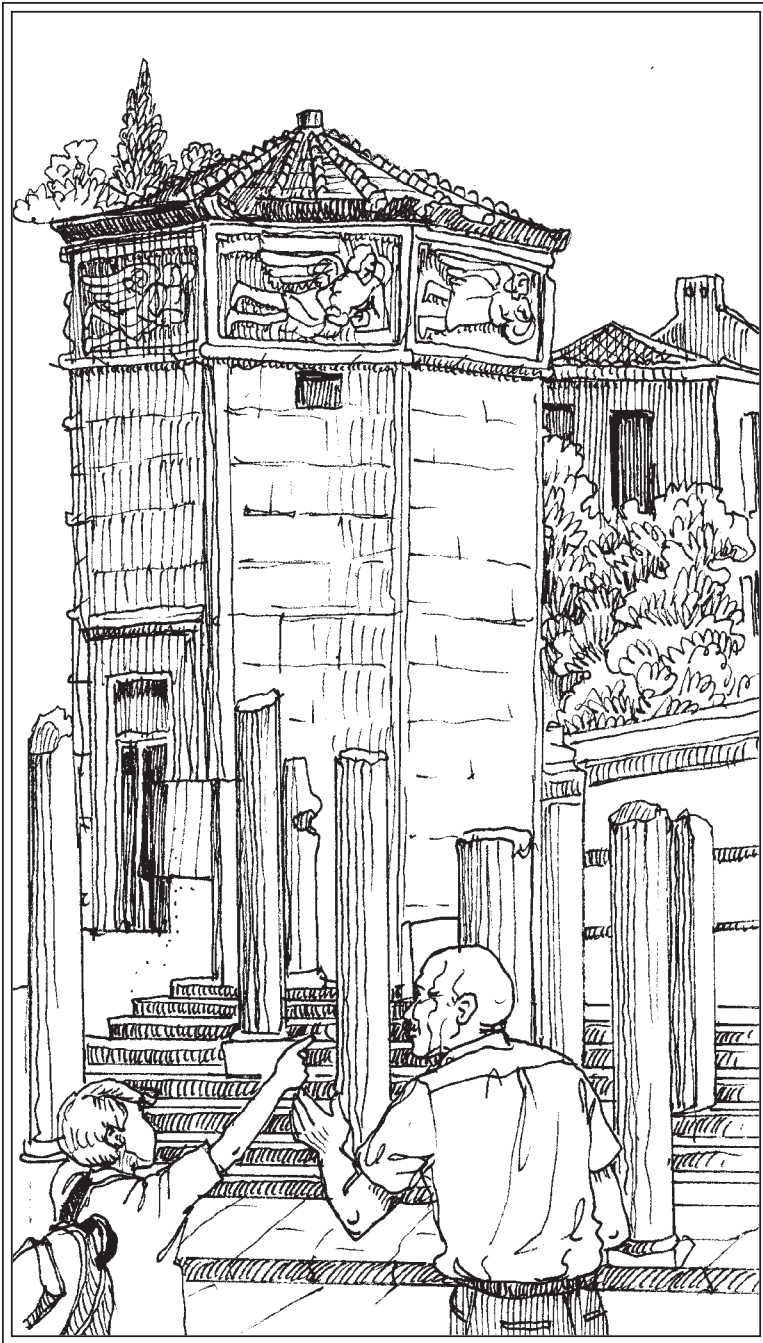
"Dimitri, what are those rods for?" Brady asked.

"Ah, so now you notice something unusual," Dimitri answered. "We miss so much in life if we fail to notice the details."

"My dad says that, too," Brady answered with a shrug. "But what are these metal things for?"

"Well, my suddenly inquisitive friend, this is the Tower of the Winds, which was built around 100 BC by an astronomer named **Andronicus** (an-draw-NAI-kuhs)." As Dimitri spoke, he leaned his head back and focused his attention on the tower. "Brady, look more closely at the carvings. Do you see the straight lines cutting through the figures?"

"Yes," Brady answered, now noticing lines stretching out from the metal rods like spokes on a wheel.



"Do you know what a sundial is?" Dimitri asked, still keeping his eyes focused on the tower.

"Yeah," Brady answered. "It sort of tells time by the shadow created by the Sun, right?"

"Exactly," Dimitri responded. "So, imagine this tower as one giant sundial, but a sundial that also works all year long as a calendar."

"I don't understand," Brady said, scratching his head and looking more closely at the markings.

"It's quite brilliant, really," Dimitri continued. "The Sun changes position in the sky throughout the year. Each of the lines, when hit by the shadow cast by the rod, informed the citizens of Athens not only as to the exact time of day, but also the exact time of year."

Dimitri took a step back and spread his arms wide in the direction of the tower: "A giant marble calendar!"

"Man, that's really cool," Brady answered enthusiastically.



“Cool?” Dimitri asked with a frown. “What exactly do you mean by ‘cool’? Be more specific.”

“Okay,” Brady replied, staring hard at the tower once again. “I guess . . . I mean . . . it’s surprising. It’s surprising that this Andronicus guy who lived so long ago could figure out exactly how to measure time.”

“Much better,” Dimitri smiled. “And speaking of time, we had better get moving if we are going to meet your parents for dinner tonight. We have much yet to see.”

DISCOVERING THE THEATER

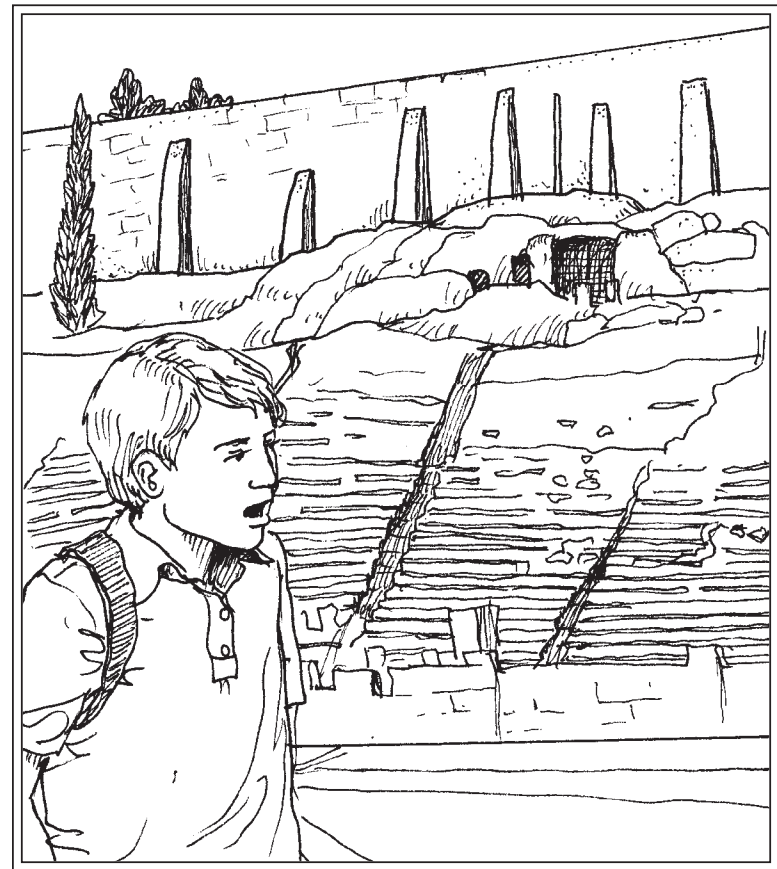
Dimitri and Brady soon rejoined the walking crowds filling the narrow stone streets at the base of the Acropolis. Brady lagged behind, unable to keep up with Dimitri’s determined pace. Brady began to notice local people working in the restaurants surrounding the Acropolis, along with tourists from all over the world with cameras around their necks and maps in hand. Suddenly, Brady gasped, “Whoa! What’s that?”

“Brady, such emotion from you? I’m surprised,” Dimitri said, with a slight grin.

“Oh, I just meant it took me by surprise, that’s all. No big deal,” Brady answered, slightly embarrassed. “But what is this place?” he continued.

Stretching up the slope toward the Acropolis, looming before Dimitri and Brady, stood row after row of stone benches in a gigantic semicircle.

The benches brightly reflected the midday sun.



After giving Brady a moment to take in the sight, Dimitri spoke: "So, Brady, do you like movies? How about television?"

"Yeah, of course," Brady answered, a bit puzzled, but not taking his eyes off the sight before him.

"Well, they started right here," Dimitri said. "All our ideas of drama, **comedy**, and **tragedy** began here with **Greek** theater. Twenty-four centuries ago, the greatest of plays were performed in this very theater, the Theater of Dionysus (dy-uh-NY-suhs)," Dimitri continued. "Once a year, 17,000 Greek citizens would watch play after play—tragedies and comedies—many of which we still perform and study. At the end of a three-day contest, the citizens would decide the winning play."

Brady tried to picture the slightly overgrown stone theater filled with people. The actors would be struggling to have their lines heard by those seated in the very top rows.

"Dimitri," Brady asked, "they didn't have microphones back then, did they?"

"Brady, it was 400 BC," Dimitri said, laughing. "There were no microphones."

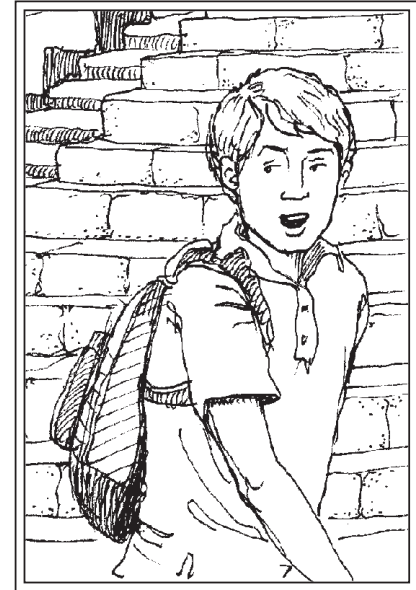
"Then how could people watching from the top rows hear the actors onstage?"

In place of an answer, Dimitri told Brady to climb to the last row of seats. As Brady scrambled up the steep marble steps worn smooth by centuries of footsteps, his leg muscles burned. He began sweating in the afternoon sun.

Brady finally reached the top row a bit out of breath.

He turned to look back toward the stage and could see Dimitri, tiny from this distance, as he stood in the middle of the stage. Dimitri waved his arm above his head to make sure he had Brady's attention. Then he cupped his hand around his ear, giving Brady the signal to listen.

Brady was completely shocked to hear Dimitri's voice come to him in a normal, everyday tone. It sounded as if Dimitri were standing right next to him, Brady thought.

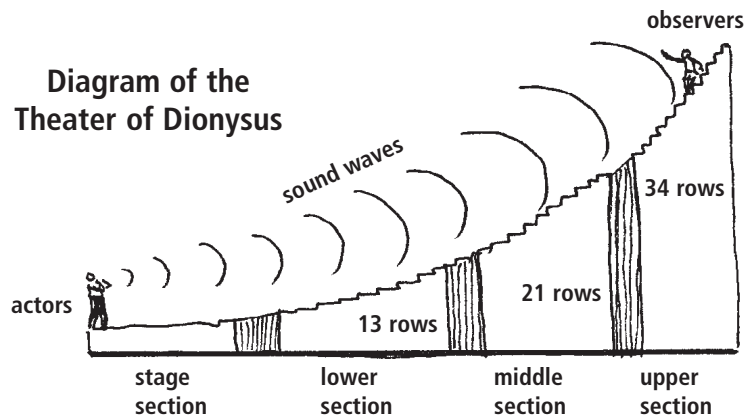


“So, Brady,” Dimitri said from below. “Can you hear how they didn’t need microphones back then?”

“Yes!” Brady yelled excitedly, his voice echoing off the nearby cliffs and stone. “This is amazing!”

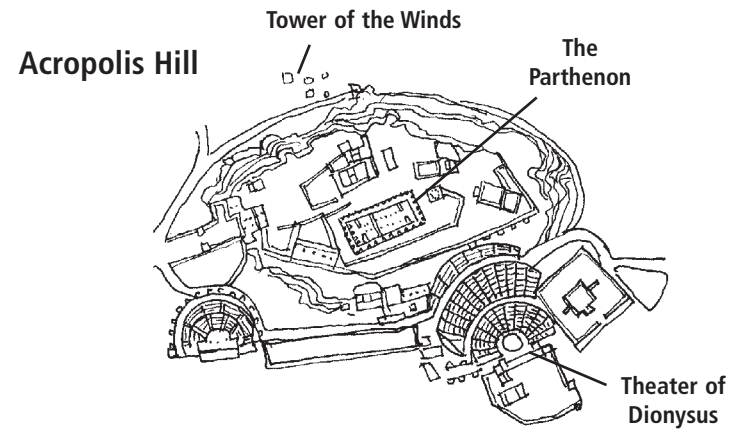
“Well, come down here, and I’ll explain how they did this,” Dimitri said.

After climbing back down, Brady listened, amazed by the simplicity of the Greeks’ plan for outdoor theaters. It was all based on mathematics, Dimitri explained. The theater was divided into three equal sections—lower, middle, and upper. Each section of the semicircle was tilted at a slightly higher angle than the level below it. This created a bowl that trapped the sound from the stage. As long as each row of seats followed the exact **proportions** to the stage, the people watching could hear the actors.



As Dimitri and Brady turned to leave the theater, Brady shook his head. “I just can’t believe that things like this could have been built so long ago. I think I’ve misjudged history.”

“Well, my friend, just wait. We still have the Acropolis to visit,” Dimitri said as they left the theater.



CLIMBING TO THE TOP

Continuing along the stone walkway that followed the curve of the hillside, they saw a crowd of people above them, gathered around the entrance gate to the Acropolis. From where Dimitri and Brady stood, all Brady could see were the modern buildings and pathways of a city park surrounding the entrance, and a series of broken-down marble buildings higher up on the hillside.

"Dimitri, I don't know what the big deal is," Brady asked, looking at the crowds of people swarming over steps leading up the hill. "We've walked all this way to see the Acropolis, but all it looks like is a bunch of broken rocks."

"Brady, my impatient, young friend, it's a matter of **perspective**," Dimitri said.

"Perspective?" Brady asked.

"Yes," Dimitri responded. "What you can see from where you are standing—this is perspective. What is important to realize is that you often can't see everything from your own viewpoint. This is an important lesson to learn." Dimitri paused for a moment, letting Brady think about what he'd said. Then he continued. "Don't you think there must be a very good reason all of these people are willing to walk all this way and climb all of these steps?"

"Yeah, I guess," Brady admitted.

"Then you need to look past only what your eyes are telling you. As far as the Acropolis is concerned, trust me, beyond the top of those marble steps lies one of the wonders of the ancient world—the Parthenon and the many buildings of the Acropolis."



Sure enough, after reaching the top, Brady's jaw dropped open at the sight before him. On the highest point of the Acropolis hill stood a stone temple with evenly spaced, massive columns of marble—the Parthenon. It was as big as a modern football stadium but was decorated with carved figures and **geometric** patterns in stone. The entire building seemed to glow a honey-orange color in the late afternoon light. Shafts of sunlight shot down between the columns, reaching toward the Earth from the sky.

Brady tried to think of something back home to compare this to, but nothing came to mind. His thoughts spun as he tried to picture this magnificent temple being built by ancient Greeks centuries before people knew the Earth was round.

"So, was it worth the climb?" Dimitri asked playfully.

"Yes, it's awesome," Brady answered.

Dimitri and Brady walked around the Parthenon admiring the perfect lines of the building and its unbelievable height. At various places near the roof, Brady saw detailed scenes carved into the stone. Even from where he stood, he could see the perfect lines of faces, clothing, animals, and gods.

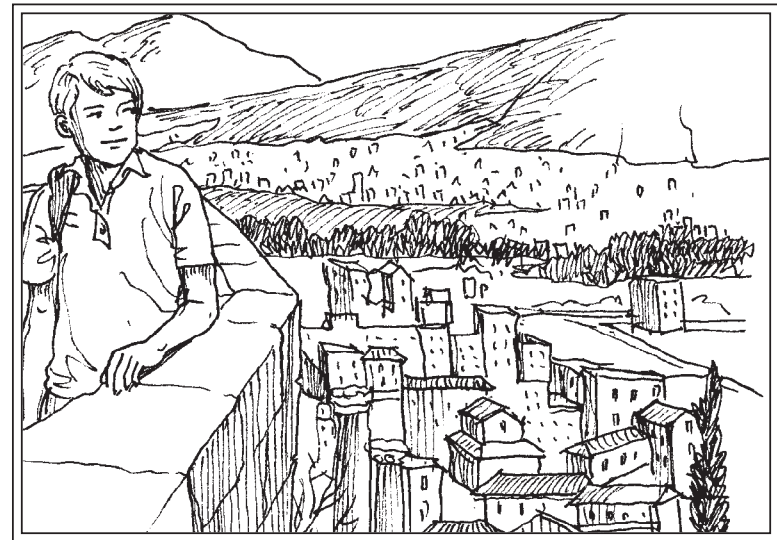
"Dimitri," he asked, after momentarily losing sight of his older friend in the crowd around the temple, "this building is so different from the great buildings I've seen. We don't really decorate our buildings, never like this. The buildings I've seen are all just glass and steel."



"That's true," Dimitri agreed. "But you have to remember, this was not just an ordinary building. This was a temple to the goddess Athena, who protected Athens. All of these buildings of the Acropolis were meant to celebrate the greatness of Athens."

"It sure is different today," Brady answered, marveling at the monument before him and comparing it to the churches and office buildings back home.

After admiring the Parthenon and the other buildings, Brady found himself at a wall on the very edge of the hilltop. Below him, in every direction, stretched the crowded streets and rooftops of Athens.



In the distance, he could see the large oval of the Olympic stadium, and, even farther away, the sea.

As the Sun turned orange and began to drop below the horizon, Brady's thoughts wandered back over all he'd seen.

"You know, Dimitri," Brady said, while focusing on the orange-and-purple sunset spilling out before him, "You are right. I need to pay more attention to the details of life around me. I would have missed so many of these amazing sights if I had been by myself. Thank you for opening my eyes."

"You don't need to thank me, my friend," Dimitri answered, putting a hand on Brady's shoulder and joining him in admiring the sunset. "Nothing in life pleases me more than seeing friends truly appreciate the wonders of life around them. You have made me very happy today." He stood silently for a moment, then continued: "And I think your father will be very proud of how you've learned to love Athens, just as he did many years ago."

In the fading light, Brady thought to himself that he would leave Greece a different person than he had been when he arrived.

GLOSSARY

ancient (<i>adj.</i>)	from a very long time ago (p. 6)
Andronicus (<i>n.</i>)	an astronomer, engineer, and architect from Syria who lived during the first century BC (p. 10)
Athens (<i>n.</i>)	the capital of Greece (p. 5)
columns (<i>n.</i>)	tall cylindrical posts used as supports and decoration for buildings (p. 8)
comedy (<i>n.</i>)	a type of entertainment with funny characters and a happy ending (p. 15)
European (<i>adj.</i>)	of or relating to the continent of Europe (p. 6)
geometric (<i>adj.</i>)	relating to the field of math that deals with angles, points, lines, surfaces, and solids (p. 20)
Greek (<i>adj.</i>)	of or relating to the country of Greece and its people (p. 15)
landmark (<i>n.</i>)	an important historical building or site (p. 8)
octagon (<i>n.</i>)	a shape with eight sides (p. 9)
perspective (<i>n.</i>)	one's own viewpoint; also, an understanding of the true relationship of things (p. 19)
proportions (<i>n.</i>)	a portion or part in relation to the whole; a pleasing arrangement of parts (p. 17)
tragedy (<i>n.</i>)	a serious play, movie, or book with a sad ending (p. 15)

Name _____

INSTRUCTIONS: Draw a picture to represent a part in the story where you stopped to visualize to help you understand what you'd just read.



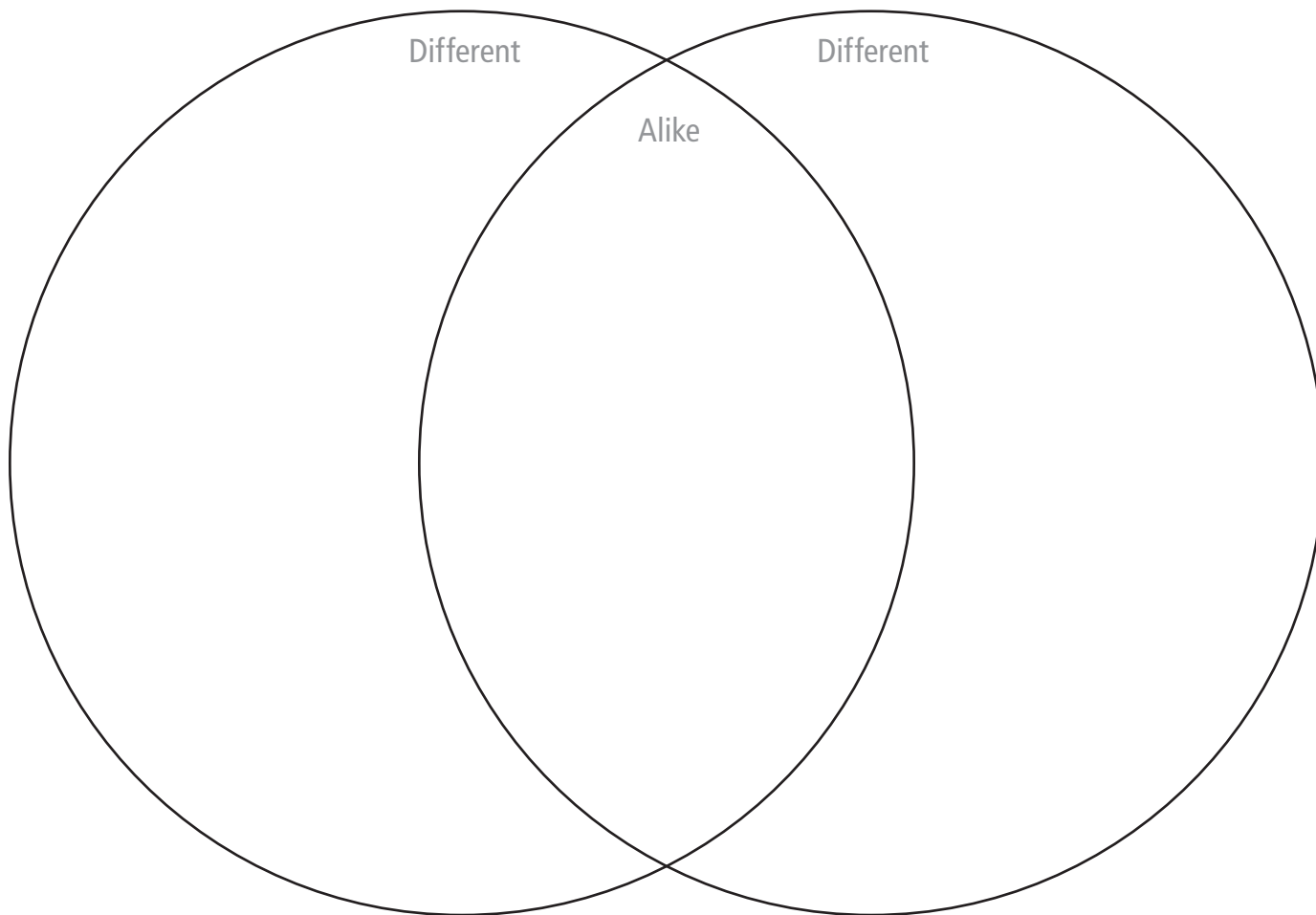
INSTRUCTIONS: Write at least five sentences to explain your drawing and the scene it represents.

Name _____

INSTRUCTIONS: Compare and contrast ancient Greece to present-day Greece. Write the two topics you are comparing on the lines below. Write the details that tell how the topics are different in the outer circles. Write details that tell how the topics are alike where the circles overlap.

Topic: _____

Topic: _____



ALIKE: _____

DIFFERENT: _____

Name _____

INSTRUCTIONS: Use *Acropolis Adventure* to complete the work below. For each example, write (S) for simile or (M) for metaphor to the left of each number to identify each example. Next, find the page on which the simile or metaphor is found in the book, and write the page number inside the parentheses. Finally, on the lines beneath each example, write what the simile or metaphor is being compared to.

_____ 1. like a huge cruise ship (page _____)

_____ 2. like spokes on a wheel (page _____)

_____ 3. like a flock of pigeons (page _____)

_____ 4. a giant marble calendar (page _____)

_____ 5. like rivers (page _____)

_____ 6. as if floating on the wind (page _____)

_____ 7. like a private park or cemetery (page _____)

_____ 8. as one giant sundial (page _____)

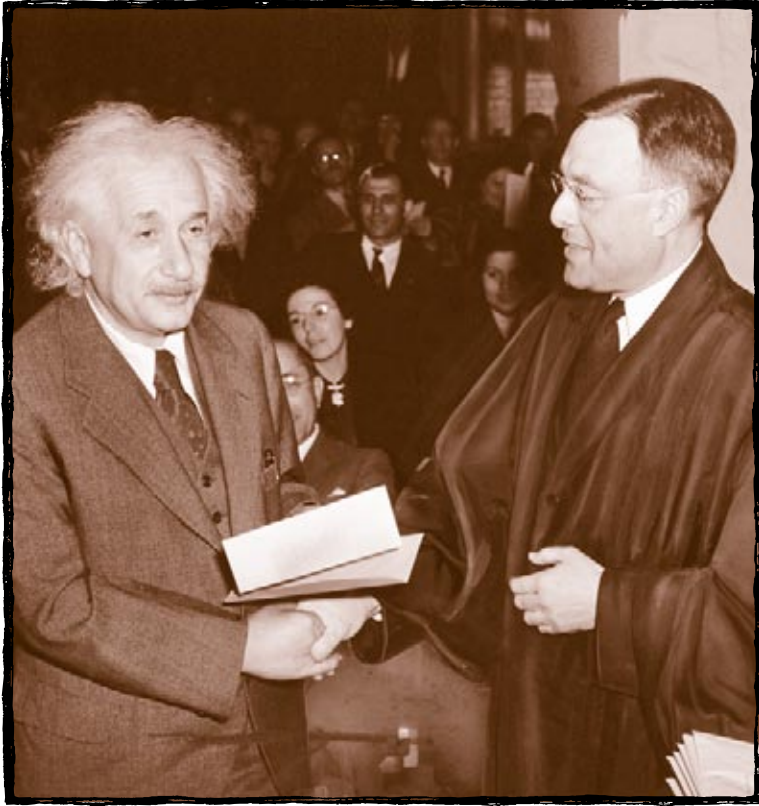
_____ 9. like a snake (page _____)

_____ 10. as big as a modern football stadium (page _____)

Albert Einstein

A Reading A-Z Level W Leveled Reader

Word Count: 2,036

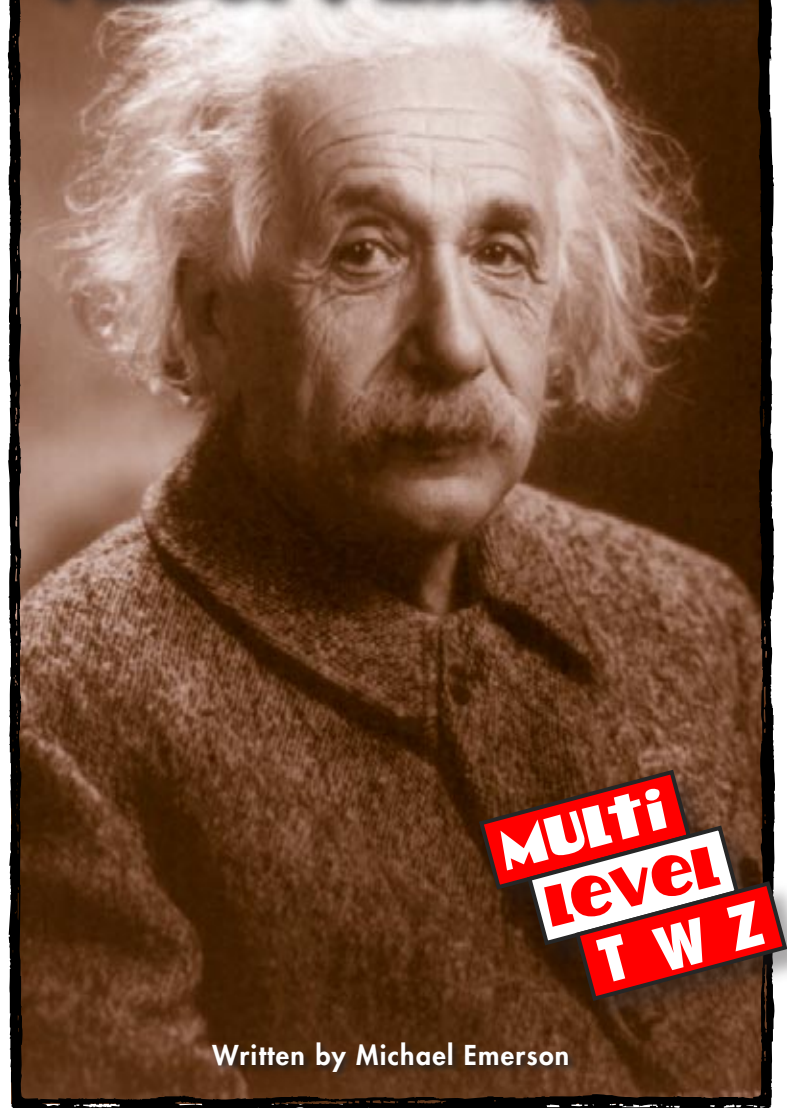


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Albert Einstein

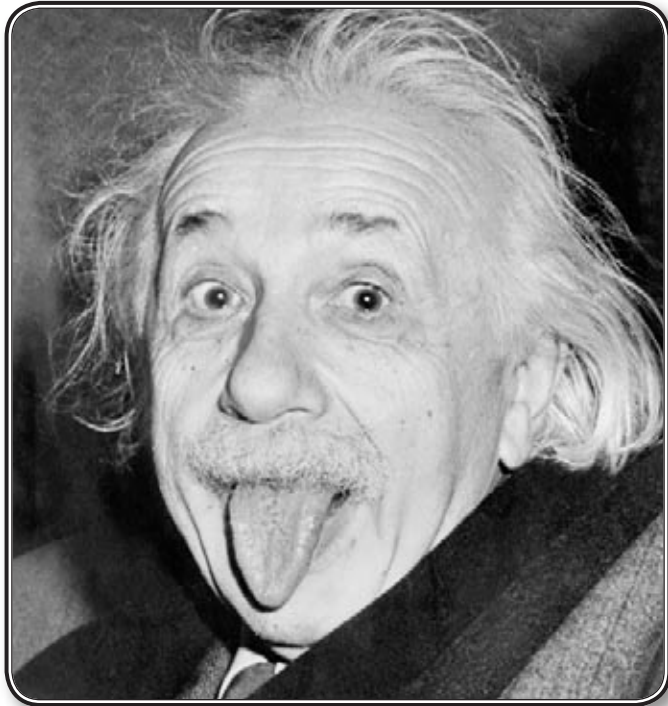


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Back cover: Einstein receives a certificate of U.S. citizenship from Judge Phillip Forman in 1940.

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Deeply Hidden Things

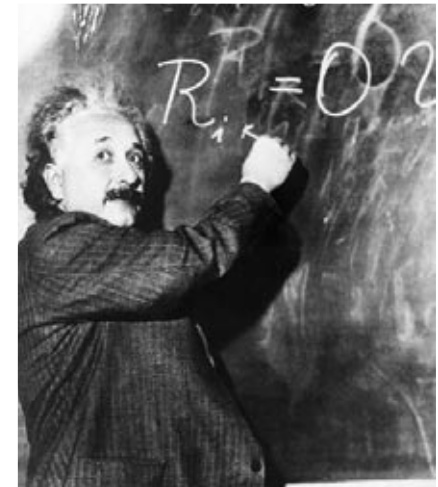


"Knowledge of what is does not open the door directly to what should be."

When Albert Einstein was five years old, his father showed him a **magnetic compass**. Watching its floating movement aroused his curiosity. What did it mean? Why did the compass's needle stay still while his father turned its casing around and around?

At the time, Einstein was too young to understand the answer, but he never forgot that feeling of wonder and mystery. Later, he wrote that watching the compass had taught him an important lesson—that

"something deeply hidden" had to be "behind things." That curious little boy grew up to become a curious scientist who spent his life trying to identify that "something." By continuing to pursue his curiosity, Albert Einstein forever changed the way people think about the **universe** in which they live.



Einstein's curiosity about complex problems led to great discoveries.



Einstein played the violin from childhood through adulthood.

A Talented, Curious Boy



*"A table, a chair, a bowl of fruit and a violin;
what else does a man need to be happy?"*

Albert Einstein was born on March 14, 1879, in the small town of Ulm, Germany. The next year, the family moved to the larger city of Munich. There, Albert's younger sister, Maja, was born. She would become his closest childhood friend.

Einstein's family had a strong influence on his life. His mother, Pauline, played the piano. When Albert was six, she encouraged him to take up the violin. Although he didn't enjoy the structured lessons of his music teacher, he loved playing the instrument. His violin would be a constant companion for the rest of his life.



Do You Know?

As a child, Einstein had a common childhood speech habit that worried his parents. Whatever the young Einstein said aloud, he would often repeat to himself in a very quiet voice. It was as if he was "rechecking his words" to see if they sounded right. Eventually he outgrew this habit and became an accomplished public speaker.

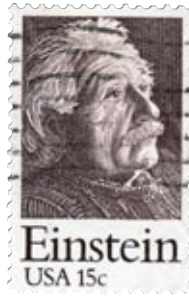
Albert Einstein with
his sister, Maja

Other family influences also shaped his future. Einstein's father and two of his uncles were electrical engineers. They introduced Einstein to math and science at an early age. One of his uncles taught him the basics of **algebra** by making it into a game. A family friend brought him science books. Einstein would **pore** over the books for hours at a time. He especially liked a book about geometry. Even as a child, Einstein had the ability to concentrate deeply. He would pursue complicated problems until he was satisfied that he had considered every solution.



"Teaching should be such that what is offered is perceived as a valuable gift and not as a hard duty."

In school, Einstein's talent for math and science was apparent immediately, but so was his individuality. He questioned the way his school's instructors taught him. German schools, like much of life in Germany at the time, were run with strict discipline. To young Einstein, the teachers seemed like army sergeants who only drilled their students to memorize useless information and lifeless facts. Einstein preferred thinking creatively.



Einstein's creative thinking was honored with a U.S. stamp.

When he was only 17 years old, Einstein was accepted at one of the finest scientific universities in Europe. Once again, Einstein's curiosity about how and why things worked led him to determine his own course. He often skipped routine lectures to spend more time in a laboratory developing his own ideas. Most of his university professors agreed that their brilliant young student might have a very bright future if only he would do as he was told.



"Imagination is more important than knowledge."

The Patent Office



"I never think of the future. It comes soon enough."

Surprisingly, Einstein had trouble finding a job after finishing school in 1900. He had been a bright student. He had graduated from one of the finest universities in Europe. However, his strong sense of independence and his curiosity had made him unpopular with the same teachers who could help him find work. A teaching position would have given him the freedom to pursue further study. While he felt the lack of one was a setback, he did not give up his interest in science. He had ideas that he wanted to think through and test. He just needed to find the time and place to pursue them.

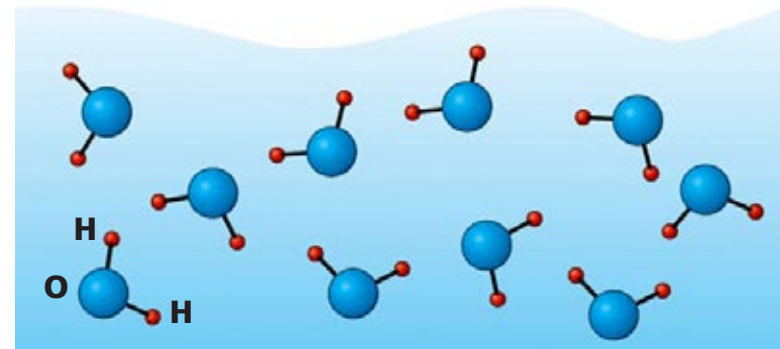
Einstein found that time in 1902. That year he took a job in a **patent** office in Bern, Switzerland. His unusual job was to make sure that new devices submitted for patent **certification** worked the way their inventors said they did.

The job in the patent office allowed Einstein to do what he did best—pursue his curiosity and question the ideas of others. On his first day at work, Einstein's boss told him, "When you pick up an application, think that anything the inventor says is wrong."

The Miracle Year

By 1905, Einstein had worked in the patent office for three years. During that time his curiosity thrived, and he applied a great deal of thought to new scientific **theories**. He soon felt confident enough in his ideas to share them.

Einstein sent papers explaining his ideas to the leading German scientific journal of the time. The journal published the first of these papers in March 1905, and four additional papers soon followed. Einstein's first paper explained his theory about the nature and behavior of light. The second and third papers proved the existence of tiny parts of matter, called **molecules** and **atoms**, and described how they moved. The final two papers offered new explanations for understanding the relationships that existed among space, time, and objects in motion.



Water molecules contain two hydrogen atoms and one oxygen atom.

Do You Know?

Einstein himself held several patents. One patent was for a compass that was not affected by the presence of large amounts of iron. The compass became standard equipment on metal ships and submarines. He also held a patent for a quieter, safer pump for refrigerators.

The secure income and regular working hours gave Einstein the freedom to work on his own ideas. In his spare time, he met with a group of friends who shared his curiosity about the scientific ideas of the day. They called themselves the Olympia Academy. Their enthusiastic group often met until late in the evening, talking and socializing in cafes or in Einstein's apartment. It was during those years of steady work and strong friendships that Einstein began to develop ideas that would change science forever.

Scientists were **astounded** by what they read. In six months, Einstein changed the way they had thought about the universe for over two hundred years! They were equally amazed that these ideas came not from a professor of **physics** at a major university, but from a curious, 26-year-old patent clerk.

As a direct result, Einstein's scientific career took off in many directions. He was energized by the attention his work received from the scientific community and by the opportunities he gained. He received invitations to speak at scientific meetings and to explain his new ideas. The 1905 Nobel Prize winner in physics contacted Einstein to congratulate him. A well-known professor of physics named Max Planck even began to teach Einstein's ideas to his students. In time, 1905 came to be known as Einstein's "miracle year."

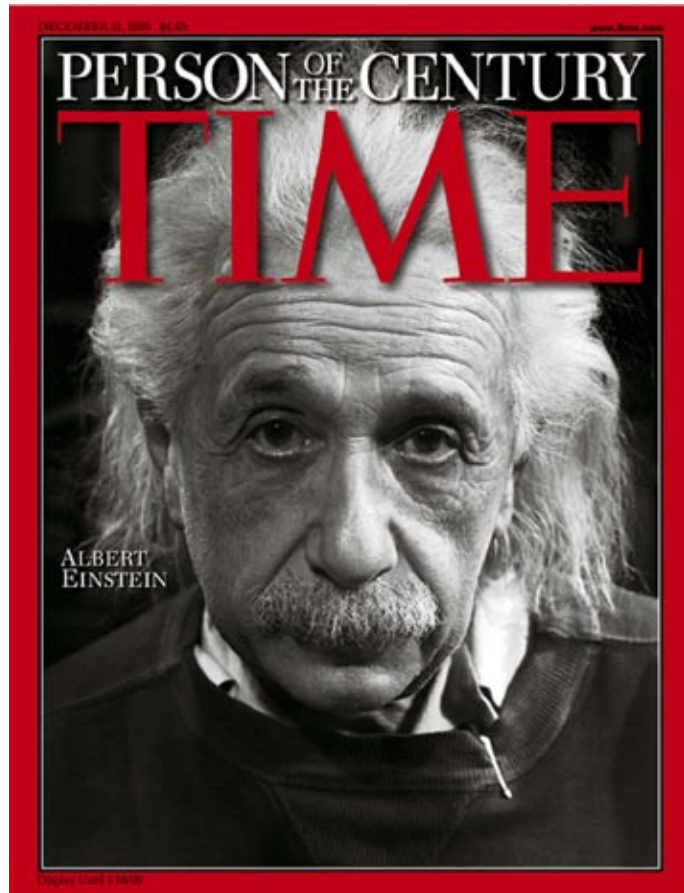


Physics professor Max Planck even taught Einstein's theories in his university classes.

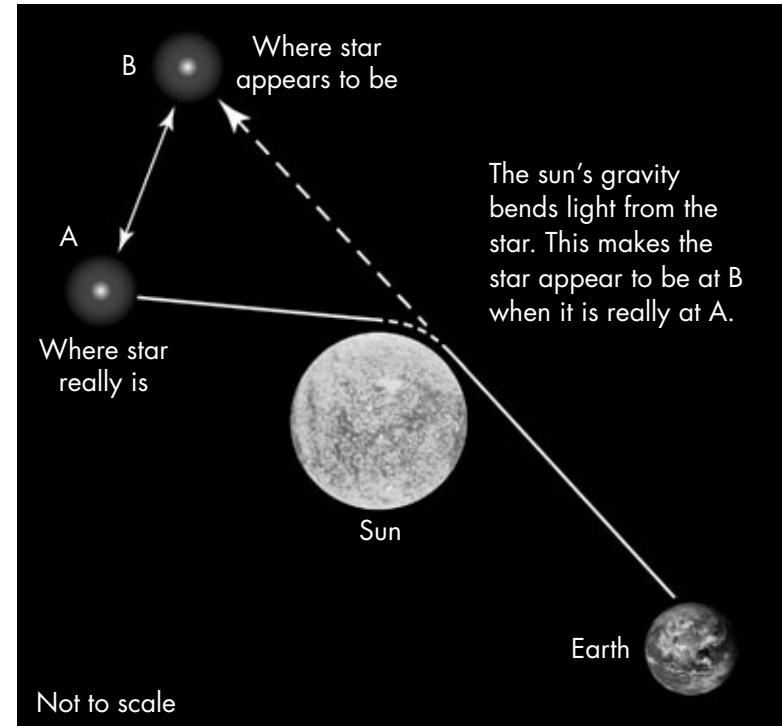
Einstein continued to work at the patent office until 1909. That year, he finally received an offer of a full-time job at a university. Einstein took the job, but then jumped from school to school for the next few years, while he searched for the ideal place to pursue his research.

Meanwhile, he continued to develop and refine his earlier ideas in new ways. It was difficult work, and Einstein often thought he was on the wrong track. In fact, his ideas were so new and so unfamiliar that he said they almost drove him insane. Then, in 1915, he had a breakthrough. He finally figured out how to unite his earlier ideas into one system, which he called the General Theory of Relativity.

Einstein's ideas once again excited scientists around the world. Before long, his ideas would begin to reach a much wider audience than he ever thought possible. In 1919, British scientists tested Einstein's theory of relativity by measuring the position of a star during a solar eclipse. If Einstein's theory was correct, the star would appear to be in one position while it was actually in another. The star appeared almost exactly where Einstein said it would be!



Newspaper headlines around the world announced the findings. A British newspaper declared, “**Revolution** in Science—New Theory of the Universe.” A German newspaper called Einstein a “new celebrity in world history” and said that his ideas were “a complete revolution in our concepts of nature.” Overnight, Albert Einstein became one of the most famous people in the world.



Despite his success, not everyone was pleased with Einstein. Many scientists had built their careers on the ideas that Einstein had tossed aside. Others did not want to believe Einstein’s theories because they would be difficult to test in a laboratory. Some people were simply prejudiced against Einstein because of his cultural background.

Einstein took this **criticism** in stride. He knew that his theories were not perfect. Yet with each new paper, more and more people came to believe in the importance of his work.



News reporters greet Albert Einstein and Elsa, his wife, arriving in New York in 1921.

The Uses of Fame



*"Try not to become a man of success
but a man of value."*

As Einstein's fame grew, so did the demand for interviews, photographs, speeches, and new writings. Einstein had mixed feelings about all this distracting attention. These demands took up time that he could have spent pursuing new research. He also knew that many people would misunderstand his ideas no matter how carefully he explained them.

Despite his concerns, Einstein knew that his fame could be used to open other people's minds and to bring his ideas to a wider audience. The more speeches and interviews he gave, the more people would hear and try to understand the world as he saw it.

Einstein also knew that he could use his fame to draw attention to issues he cared about outside of science. One of Einstein's most deeply held beliefs was that war should be avoided if at all possible. In 1914, he was one of only three scientists who signed a letter opposing Germany's participation in World War I. More than 100 scientists had signed a letter in support of Germany entering the war. Now that he had the world's attention through his scientific work, he stepped up his antiwar efforts. He worked with international groups working for peace and wrote about his antiwar beliefs. When Germany began preparing for war again in the 1920s and 1930s, Einstein continued to speak out.

Do You Know?

In the 1930s Einstein began to publish a series of articles for general audiences titled *The World as I See It*. The collection covered topics from war and liberty, to progress and education—not just science.

Einstein also believed strongly in creating a new Jewish country, to be called Israel, in the Middle East. Beginning in 1921, he became more visible in his support of the Jewish national cause. In 1952 he was offered the presidency of the new country of Israel, which he respectfully declined.

Coming to America

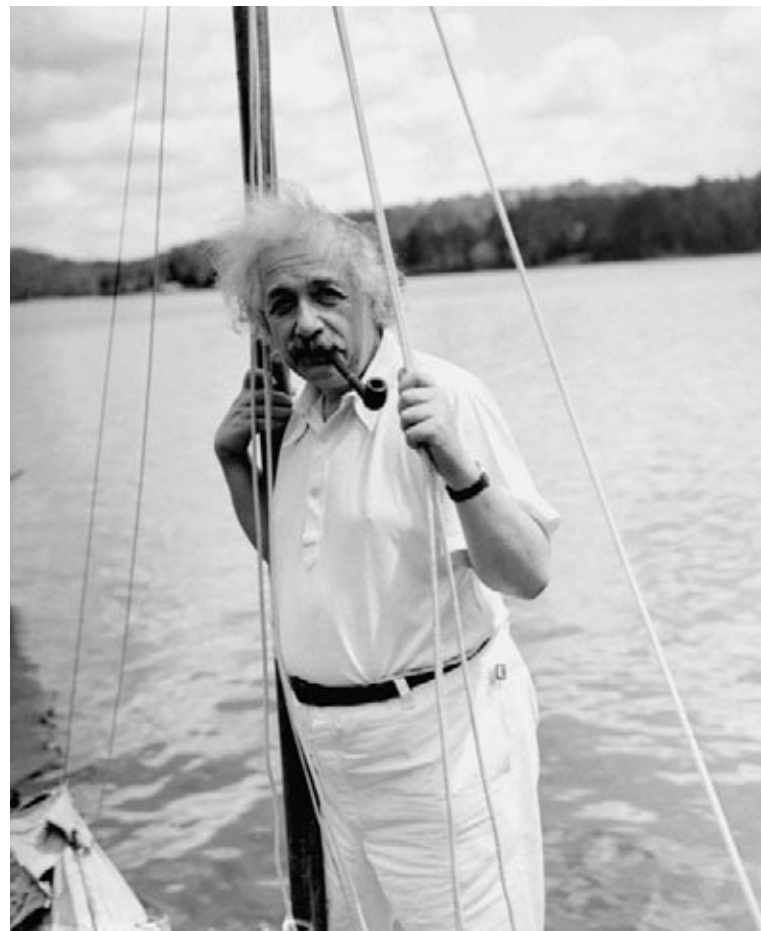


"The most important motive for work in school and in life is pleasure in work, pleasure in its result, and the knowledge of the value of the result to the community."

Despite the efforts of Einstein and others to promote peace, Germany moved closer to war in the 1930s. Until that point in time, the German government had merely tolerated Einstein and his criticism of its plans. Einstein knew that this tolerance would not last. In 1933, he left Germany and took a job at Princeton University in the United States.



Einstein meets with Jawarhalal Nehru, prime minister of India, at Einstein's home in Princeton, New Jersey in 1949.



Einstein enjoyed sailing, and often took his boat out on Princeton's Lake Carnegie.

At Princeton, Einstein moved his family into a house close to his office. They soon became part of Princeton's close-knit community. When out-of-town visitors wanted to know where the great man lived, townspeople would ask, "Are you expected?" This question prevented strangers from bothering Einstein at home.

For the next 29 years, Einstein continued working to expand his ideas into new areas. Some people thought his efforts showed that he was losing touch. Einstein didn't pay much attention to this criticism. He believed that he could develop a new theory that would unify his original ideas with the latest theories. He remained dedicated to his work and ideas, yet he never achieved the sort of breakthroughs he'd had during the "miracle year" or with his General Theory of Relativity. Always in demand, he continued to give speeches, write articles, and meet regularly with fellow scientists.



Albert Einstein goes over matters with secretary Helen Dukas, who worked with Einstein from 1928 until his death in 1955.

Einstein's Influence



"Few are those who see with their own eyes and feel with their own hearts."

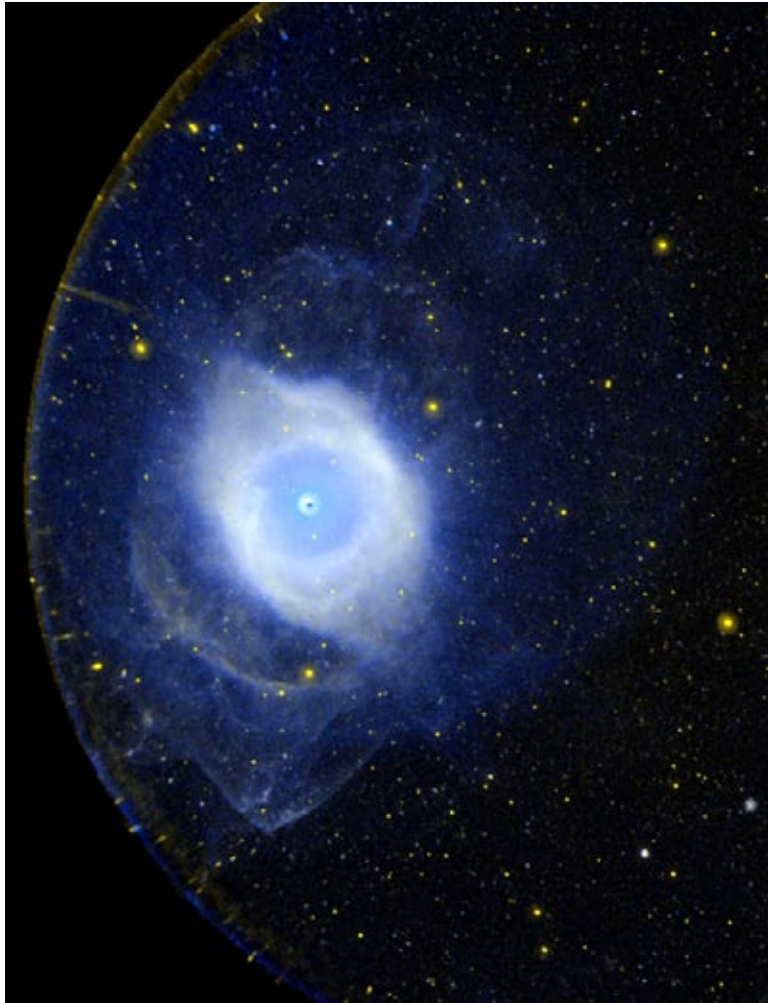
Einstein was not an inventor. Yet his curiosity led to the creation of many useful products. For example, Einstein's ideas about the nature and behavior of light led scientists to develop new ways to control light. These technologies eventually led to television cameras, remote controls for home electronics, and flat-screen computers.



Einstein was also the first person to think of laser light. This technology is now used in compact discs, digital video discs, and supermarket checkout equipment. His proof of the existence of atoms and molecules led to the creation

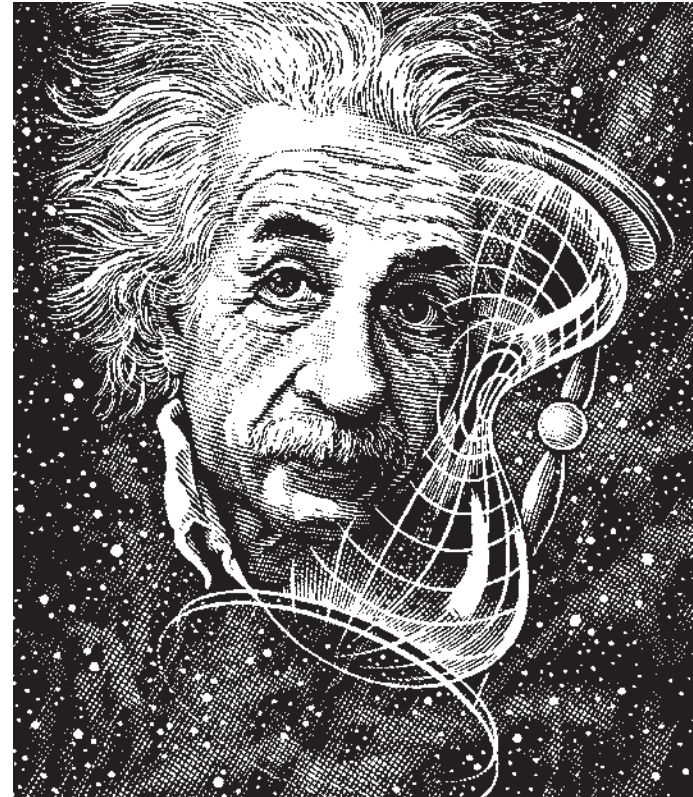
or improvement of a wide range of everyday products. Those products include shaving cream, toothpaste, personal computers, and portable phones.





Einstein's theories provide scientists with a framework to study space objects, such as the Helix Nebula.

Einstein's scientific ideas continue to influence new theories. Current ideas about the origins of the universe, the nature of space, and strange objects called black holes all owe a large debt to Einstein's work.



A Life Well Lived

Einstein once said, "The most beautiful experience we can have is the **mysterious**. . . . It is enough to try to understand a little of this mystery every day."

Until his death on April 18, 1955, Einstein's curiosity led him to work to understand nature's greatest mysteries. In doing so, he changed the way people think about time, space, energy, and matter—the foundation of the universe.

Glossary

algebra (<i>n.</i>)	a branch of math in which symbols, usually letters, are used to represent unknown numbers (p. 6)
astounded (<i>v.</i>)	completely surprised; amazed (p. 11)
atoms (<i>n.</i>)	tiny pieces of matter (p. 10)
certification (<i>n.</i>)	the process of receiving an official document showing that something works as claimed (p. 8)
criticism (<i>n.</i>)	the act of finding fault, or carefully judging for review (p. 14)
magnetic compass (<i>n.</i>)	a tool that shows which direction is north (p. 4)
molecules (<i>n.</i>)	the smallest parts of a substance that are still identifiable as that substance (p. 10)
mysterious (<i>adj.</i>)	not easily understandable (p. 22)
patent (<i>n.</i>)	a document that grants an inventor the right to make money from an invention (p. 8)
pore (<i>v.</i>)	to read with great attention (p. 6)
physics (<i>n.</i>)	the scientific study of matter and energy (p. 11)
revolution (<i>n.</i>)	an overthrow of previous ideas (p. 13)
theories (<i>n.</i>)	possible explanations; in science, all theories are supported by evidence (p. 10)
universe (<i>n.</i>)	all things that exist in space (p. 4)

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Name _____

INSTRUCTIONS: In the first column, write what you already know about Albert Einstein. In the second column, write what you would like to learn about him. After you finish reading, fill in the third column with information you learned from reading the book and the fourth column with what you still want to know.

(K) What I Know	(W) What I Want to Know	(L) What I Learned	(S) What I Still Want To Know

Reading a-z

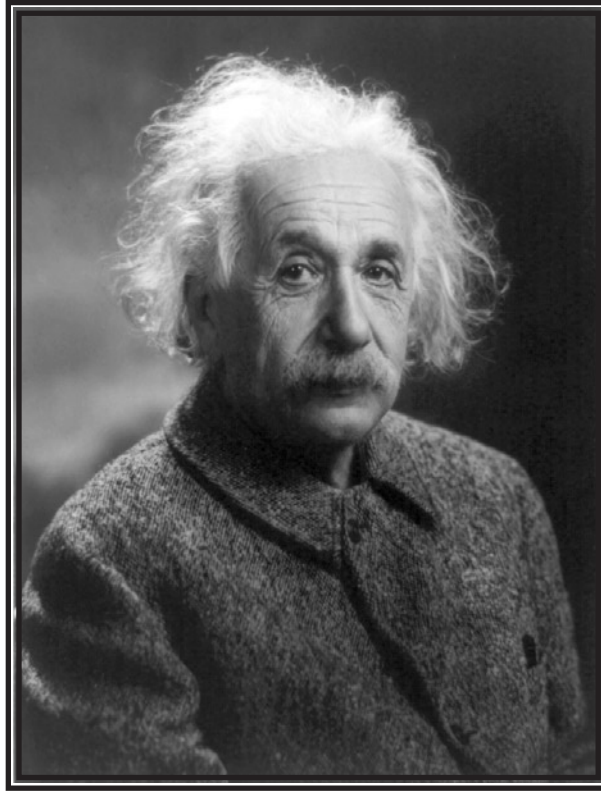
Book/Topic: _____

ALBERT EINSTEIN • LEVEL W • 2

SKILL: SEQUENCE EVENTS

Name _____

INSTRUCTIONS: In the sentences below, circle the adjectives and adjective phrases. Then underline the noun or nouns they describe.



ALBERT EINSTEIN • LEVEL W • 3

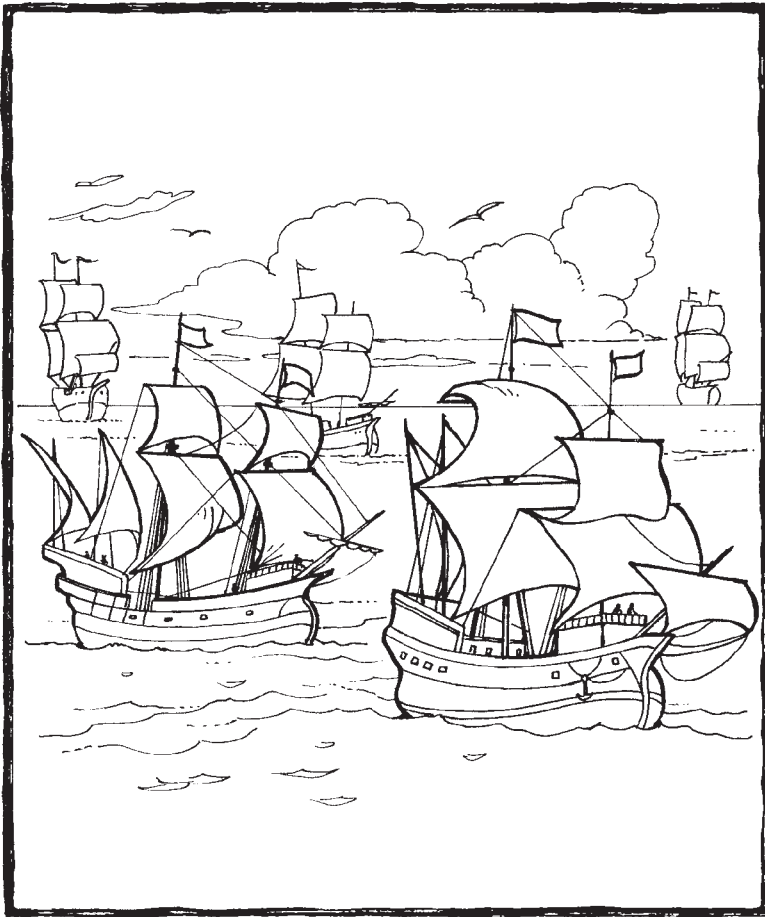
1. Einstein was a well-taught individual with unique ideas.
2. The great ideas came from a curious 26-six-year-old patent clerk.
3. A well-known professor of physics began to teach Einstein's new ideas.
4. He finally received an offer for a full-time job at a prestigious university.
5. They soon became part of Princeton's close-knit community.
6. Out-of-town visitors wanted to know where the great man lived.
7. Einstein was an intelligent, German-born man.
8. He could be highly self-critical.
9. Einstein's ideas about what light is and how it behaves led scientists to develop new technology such as flat-screen computers.

SKILL: COMPOUND ADJECTIVES

Ships of Discovery

A Reading A-Z Level W Leveled Reader

Word Count: 2,171



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Ships of Discovery

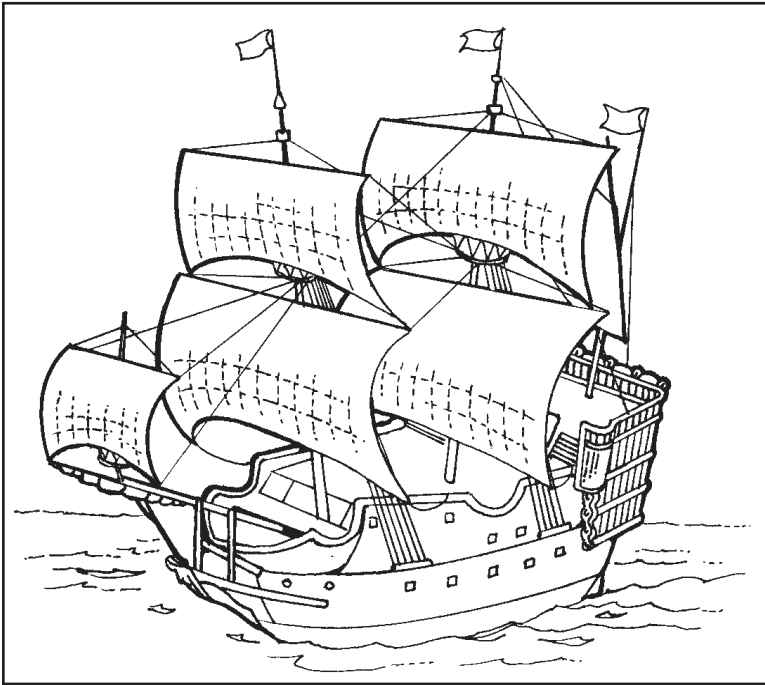


**Multi
Level
T W Y**

Written by William Houseman
Illustrated by Cende Hill

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Ships of Discovery



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Ships of Discovery
Level W Leveled Reader
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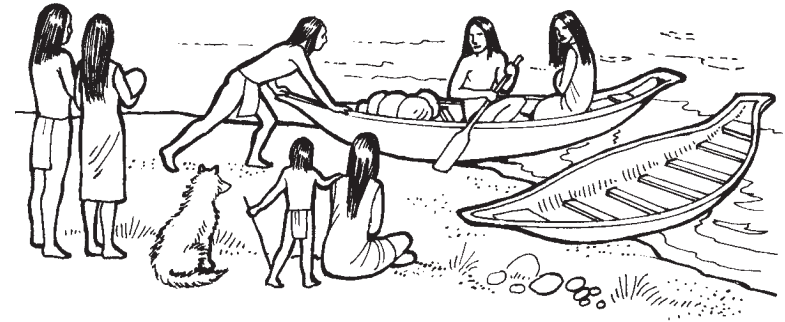
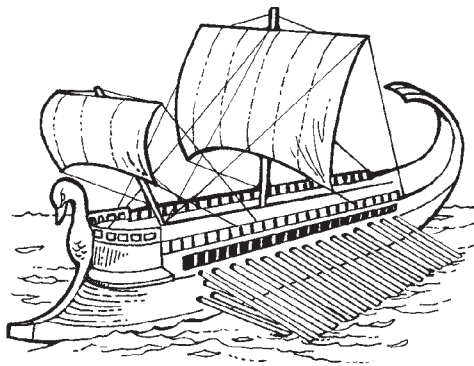
Correlation

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Introduction

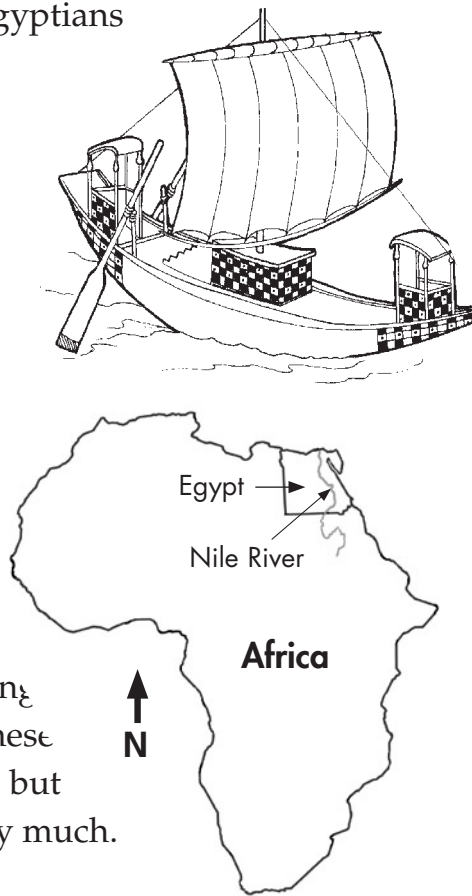
People often settle along rivers, lakes, and seas where they can find fresh water, nutrient-rich soil, and **bountiful** fishing. Long ago, people who lived near large bodies of water were curious about what might lie beyond the horizon. They also wondered if traveling over water might be easier than traveling over land. These thoughts led someone to build the first simple boat.

As boats and ships became larger and faster, people were able to travel farther from home. Advances in technology led to new types of boats that were safer, faster, more comfortable, and carried more cargo. Over time, people found that boats were useful tools for conducting trade or warfare with their neighbors. Let's examine how boats were used to explore the world and how they have changed over time.

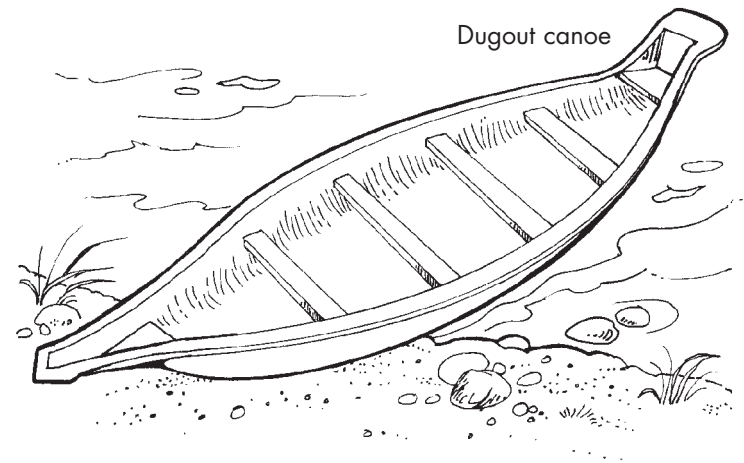
Early Years

The oldest record of sea travel comes from Egypt. People may have been sailing the seas even earlier, but the Egyptians were the first to leave us records of their journeys. More than 6,000 years ago, the Egyptians took to the water and carved images of themselves in stone to record the event. Originally, they built **primitive** boats by carving out the trunks of trees. But the Egyptians were not the only people to make boats from trees. Many other cultures that looked for ways to cross the water also carved boats from trees.

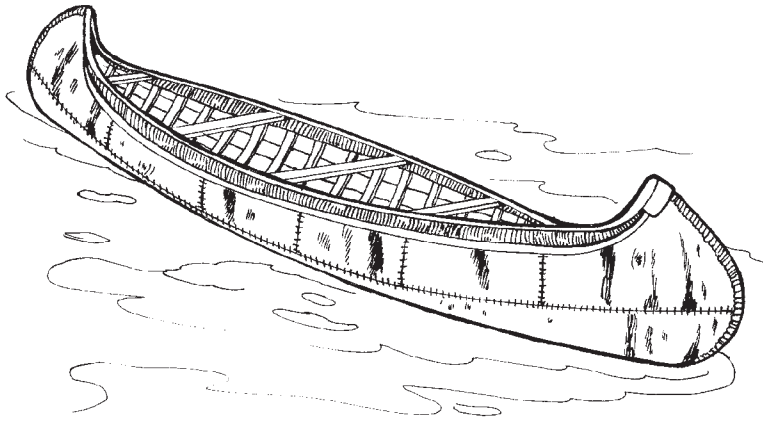
Far away, in America, native people were also building dugout canoes by hollowing out tree trunks. These boats were sturdy, but they couldn't carry much.



Over time, people wanted to transport larger cargoes over waterways. It became necessary to construct boats that could carry many people for long voyages as well as food, animals, and other items to trade. Canoes carved from a single oak tree and steered with a pole were good enough for crossing a lake or going down a river. However, they didn't work well for transporting bulky objects. Imagine trying to row a narrow canoe across a wide lake with six sheep crammed around you!



Humans have always wanted to perfect their inventions. So it was natural that people searched for methods to build bigger, faster, and safer boats. People realized that they needed better boats to explore places far from their homeland.



Birchbark canoe

The next evolution in boat building was the use of wooden beams to make a frame. The frame was then covered with wooden planks or bark from trees. Some cultures even used animal skins stretched over the frame to create a **hull** (the outer shell of a boat). These boats were bigger than earlier designs but were also more streamlined and able to hold more cargo. People also developed paddles and oars to move in deep water, where poles could not reach the bottom.

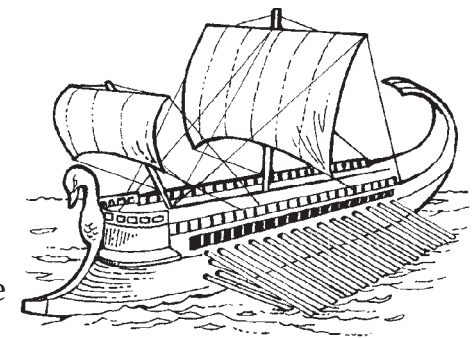
The Egyptians were the first to cover a wooden frame with long, flat pieces of wood to create a hull. Some of their boats measured as long as 21.3 meters (70 ft). The Egyptians were also first to use sails. Sails eliminated or reduced the need for people to row the boats. Some boats used both rowers and sails.

Soon, the Greeks and other peoples around the Mediterranean Sea were building large boats powered by sails. About 3,000 years ago, sailing ships were built with two masts, each one carrying a sail. The addition of a second mast made ships much easier to steer and also made them much faster.

Five hundred years later, the Greeks had developed a ship with four sails. This ship was safe enough to leave the Mediterranean Sea and travel down the west African coast.

Some of the fastest ships at the time were built for battle. They had as many as three levels of rowers on each side. Arranging the rowers above each other on separate **tiers** provided a lot of power in a small amount of space. Greek ships with three tiers of rowers were called **triremes**.

These larger ships allowed people to travel to and explore distant places. During this period, exploration and trade moved beyond the Mediterranean Sea.

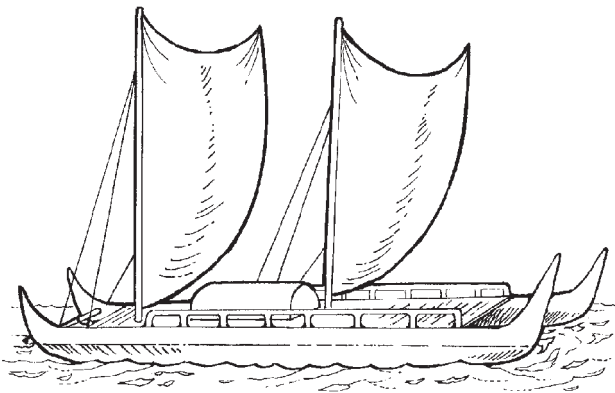


Greek trireme

The Polynesians

In the South Pacific, groups of Pacific Island peoples were building boats that could sail in the open ocean. Over 3,500 years ago, these people were traveling east, well beyond the islands where they lived. They also explored areas off the Asian mainland. More than a thousand years ago, these people made journeys of thousands of miles in open boats.

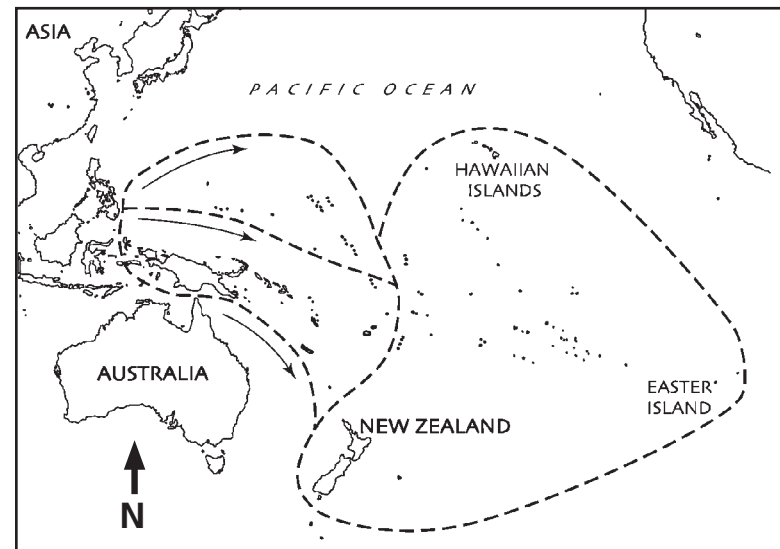
These Polynesian sailors built a boat that was an early version of the modern **catamaran**. They took two canoes and connected them using large wooden poles. A deck was then built to span the poles. These boats usually measured about 15 to 18 meters (50–60 ft) long. The central deck held masts for sails and had enough space for several people and their supplies for a lengthy voyage.



Polynesian catamaran

These early boats provided a safe means of travel from one island to another. The Polynesians settled many new islands they discovered. By the beginning of the year AD 1000, they lived on nearly every island they could find in the Pacific Ocean. Their new homes included Hawaii, New Zealand, and Easter Island.

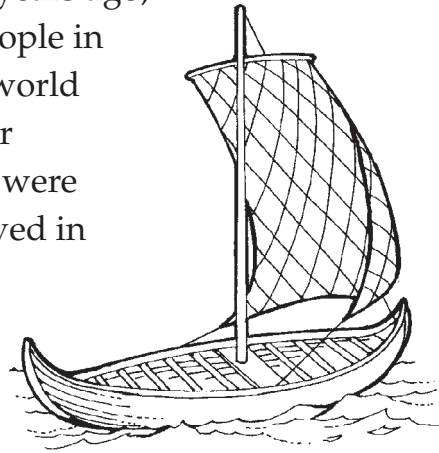
The Polynesians were accomplished sailors. They became so familiar with the ocean that they could determine their location by the size and shape of the waves. They also knew how to navigate using the stars. They could easily travel great distances by going from island to island. The Polynesians grew to accept sea travel as a way of life.



Routes of Polynesian expansion

The Vikings

More than 1,300 years ago, another group of people in another part of the world began to build larger boats. These people were the Vikings. They lived in the northern part of Europe. The Vikings were well known as warriors and conquerors. The Vikings were used to traveling over water. By the year 700, they were sailing boats that were superior to any others on the ocean.



Viking knarr

The boats they built, called **knarrs**, were used primarily for trading. These boats were up to 16.5 meters (54 ft) long and 4.5 meters (15 ft) wide.

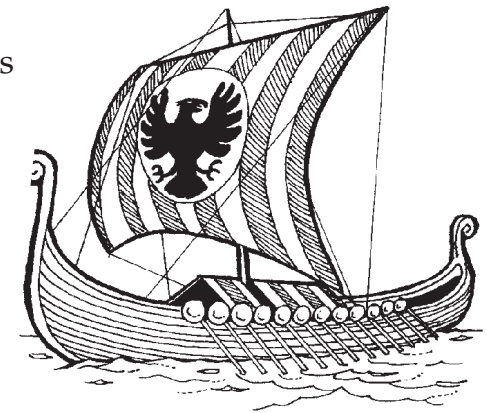
Because they were flat bottomed, the knarr boats could carry heavy loads, and they were wide enough to carry large amounts of cargo. They were also very stable and could travel safely across the open ocean.

At that time, most sailors did not like to lose sight of the coast, but the Vikings were fearless. They used a wooden dial called a sun compass to navigate. Viking explorers were willing to travel into the unknown to claim new lands and seek adventure. They were also the first Europeans to visit North America.

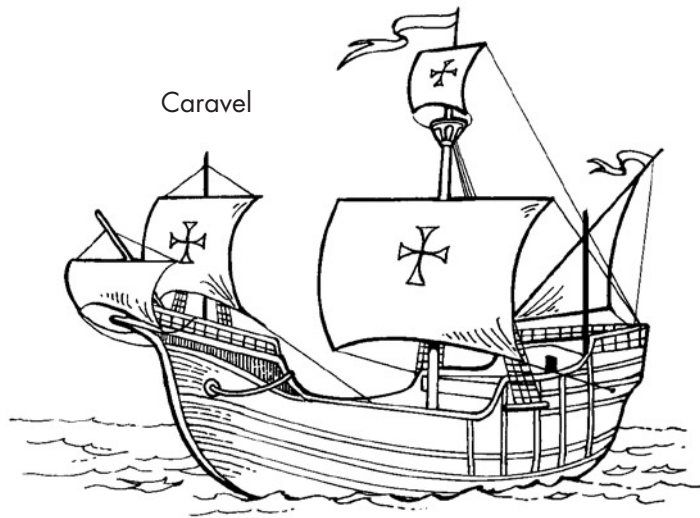
The Vikings also built warships known as longships. Longships looked the same in the front and in the back. Because of the design of their longships, Viking attackers could easily change direction. Longships were able to travel as fast as 15 **knots**.

(A knot is a way to measure speed on water. One knot is a little faster than one mile per

hour.) Some of the larger longships carried as many as 200 warriors. The combination of large, speedy, easy-to-handle ships and a fierce fighting spirit made the Vikings tough to defeat. The Vikings ruled the ocean for nearly three centuries.



Viking longship



Age of Discovery

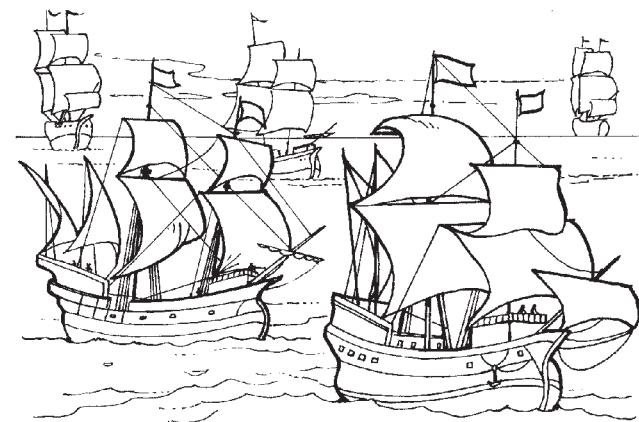
Until the 1400s, most sea explorers remained close to their home waters. But with the coming of the Age of Discovery, things changed dramatically. Every European sailing nation wanted to find new lands. The race was on, and the Americas were the prize.

Shipbuilders searched for ways to build faster and safer ships. In the 1400s and 1500s, Christopher Columbus and other explorers used small, swift, sturdy ships known as **caravels**. These ships had three masts to carry sails. This design made the ships faster and easier to steer. Caravels had square sails on the front and the middle main masts and a triangular-shaped sail on the rear mast.

The Santa Maria was the largest of Columbus's ships at 27.4 meters (90 ft) long and 9.1 meters (30 ft) wide. Compared to modern ocean liners and cargo ships, these ships were tiny. They didn't even have rooms where the crew could sleep at night. Sailors just had to lie down on the deck or in the hold.

But even though caravels were small, the explorer Ferdinand Magellan set out to sail five of these ships around the world with a crew of 260 sailors.

Almost three years after they began the trip, they returned. Only one of Magellan's ships and eighteen of the crew made it around the world. Magellan was not one of the survivors. He was killed somewhere in the Philippine Islands.

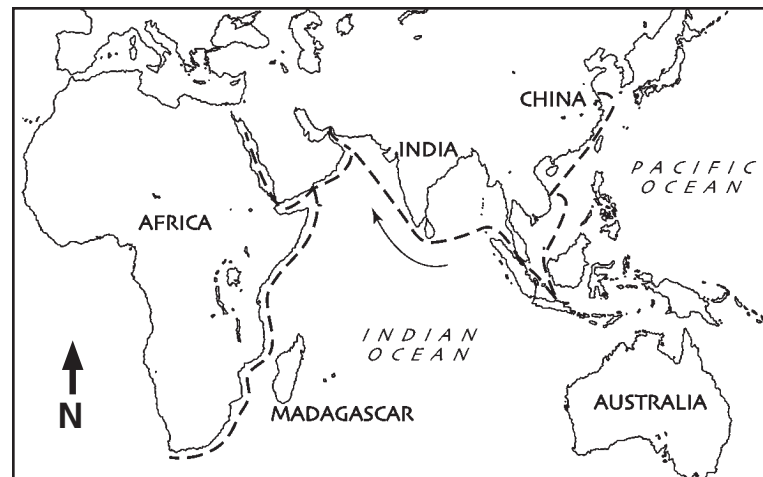


Magellan's ships

The Chinese

While European explorers were sailing the world, the Chinese had also taken to the sea in another part of the world. By the 1400s, they were skilled sailors. Chinese people had long since invented the magnetic compass. They reinforced their rectangular sails with bamboo, which made them sturdy and easy to furl and unfurl. Sailors could even climb the sails like ladders!

From 1405 to 1443, the most famous Chinese explorer, Zheng He, traveled on seven long voyages with a fleet of sixty-two treasure ships. The Chinese called these ships “junks.” Zheng He’s junks were much larger than European ships. His largest ship was so big that it could have held all three of Columbus’s ships on its deck. This huge ship was 121 meters (400 ft) long and 45.7 meters (150 ft) wide. But these ships were still small compared to today’s modern ships. In addition to the sixty-two main trading ships, more than a hundred smaller support boats were in the fleet. The Chinese sailed all the way to Africa to trade as well as to show the might of the Chinese empire to the rest of the world. Zheng He even carried a giraffe home to the emperor.



Route of Chinese exploration and trading

War with their Asian neighbors caused the Chinese to turn their attention away from exploration. The emperor made ocean voyages illegal and had all the treasure ships destroyed. If the Chinese had continued their explorations, we might be studying how the Chinese discovered

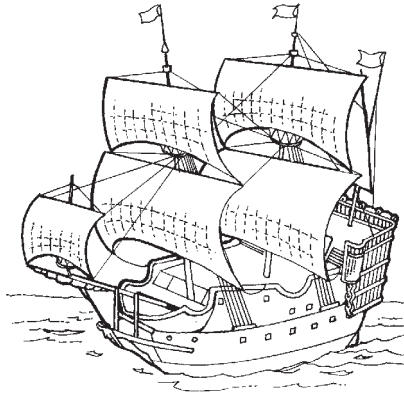


Chinese junk

America. And North and South Americans might be speaking Chinese instead of French, English, Spanish, and Portuguese.

Later Years

As sea exploration continued, the Spanish led the way. By the 1500s, European shipbuilding had experienced vast improvements. The newest ships, called **galleons**, were larger, faster, and more comfortable. It took two thousand oak trees to build one galleon. These vessels were as long as 42.7 meters (140 ft), but were still small compared to Chinese ships. Many of them had nice, comfortable living quarters, at least for the officers. Galleons served as both trading vessels and warships. Because of their great size, these warships could carry many cannons on board, making them dangerous in battle.



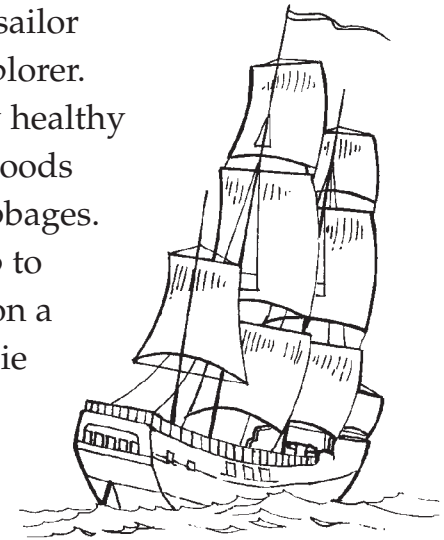
Galleon

In the late 1700s, Captain James Cook began some of the greatest explorations of his time. In his first ship, *Endeavour*, Cook sailed around the world. His ship was only 32 meters (105 ft) in length. It also had a shallow hold, sitting only 4.3 meters (14 ft) deep when fully loaded.

Cook was interested in knowledge and science, and brought three scientists with him when he traveled. He also took many artists to document their discoveries. Cook observed the stars as he sailed, and whenever he came to a new land, he learned about its plants and animals. His work broadened the European understanding of the world.

Cook was a great sailor and an intelligent explorer. He also kept his crew healthy by making them eat foods such as limes and cabbages. Until Cook's time, up to one-half of the crew on a long voyage would die of **scurvy** or other diseases. Cook knew his success as an explorer depended on

keeping his crew in good health. Soon, all British sailors knew that they needed to eat vitamin C to survive. Sadly, although Cook tried to remain friendly everywhere he went, he was killed in a fight in Hawaii in 1779.



The Endeavour

Conclusion

By the middle of the 1800s, sailors had explored and mapped most of the world's coastlines. As people settled farther from their homelands, larger ships were needed to move people and supplies over great distances. Very fast ships called clipper ships carried people across oceans in a matter of days. Some of these ships had as many as thirty-five sails and could travel even in very light winds.

By the 1870s, however, the steam engine largely replaced wind power. The industrial revolution swung into full gear, and machines became more significant to everyone. Bigger and faster ships than had ever been imagined suddenly became possible. Today, steam is outdated and ships run on different types of fuel. Some submarines and aircraft carriers even run on nuclear power! Giant cruise ships carry thousands of people at a time like floating cities.

When we look at some of the ships used by early explorers to sail across oceans, we have to admire their courage. Explorers and their ships of discovery helped create the world we live in.

Glossary

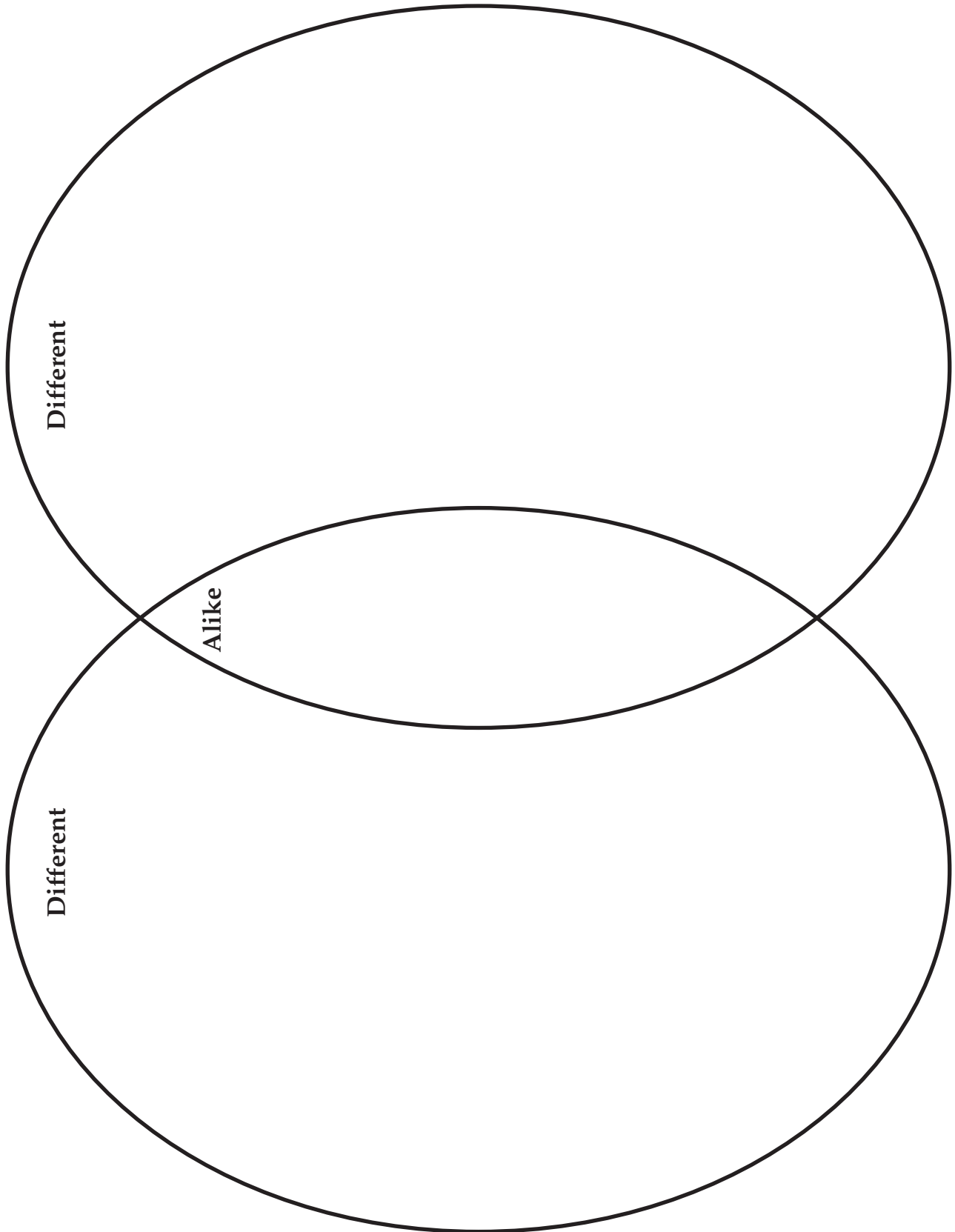
bountiful (<i>adj.</i>)	plentiful; abundant (p. 4)
caravels (<i>n.</i>)	small European sailing ships from the 1400s and 1500s (p. 13)
catamaran (<i>n.</i>)	a sailing vessel with twin hulls and a deck connecting the hulls (p. 9)
galleons (<i>n.</i>)	heavy Spanish sailing ships of the 15th to early 18th centuries used for war or trade (p. 17)
hull (<i>n.</i>)	the main body of a sailing vessel (p. 7)
knarrs (<i>n.</i>)	Viking merchant ships (p. 11)
knots (<i>n.</i>)	units of measurement of a ship's speed equal to one nautical mile per hour (p. 12)
primitive (<i>adj.</i>)	appearing to be at an earlier stage of development (p. 5)
scurvy (<i>n.</i>)	a life-threatening illness common to early sailors that was caused by a lack of vitamin C (p. 18)
tiers (<i>n.</i>)	rows or levels arranged one above another (p. 8)
triremes (<i>n.</i>)	ancient galleys equipped with three banks of oars (p. 8)

Name _____

Instructions: Compare and contrast Spanish galleons and Chinese junks. Write in the two topics you are comparing on the lines below. Write the details that tell how the topics are different in the outer circles. Write details that tell how the topics are alike where the circles overlap.

Topic: _____

Topic: _____



Name _____

Instructions: Write a sentence for each of the following nouns. Include at least two adjectives to help describe the noun.

ship

water

sailor

world

mast

sails

cabbage

deck

lime

car

Name _____

PART 1 INSTRUCTIONS: Match words from the left-hand column with words from the right-hand column to create compound words found in *Ships of Discovery*. Then write the compound words you created on the lines below.

water

lined

home

where

stream

two

main

shaped

New

Islands

flat-

ships

North

land

some

Zealand

triangular-

ways

Philippine

land

sixty-

America

ship

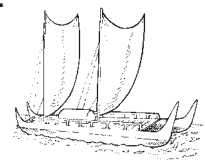
bottomed

clipper

building

PART 2 INSTRUCTIONS: Think of other compound words you know, and write them in the box.

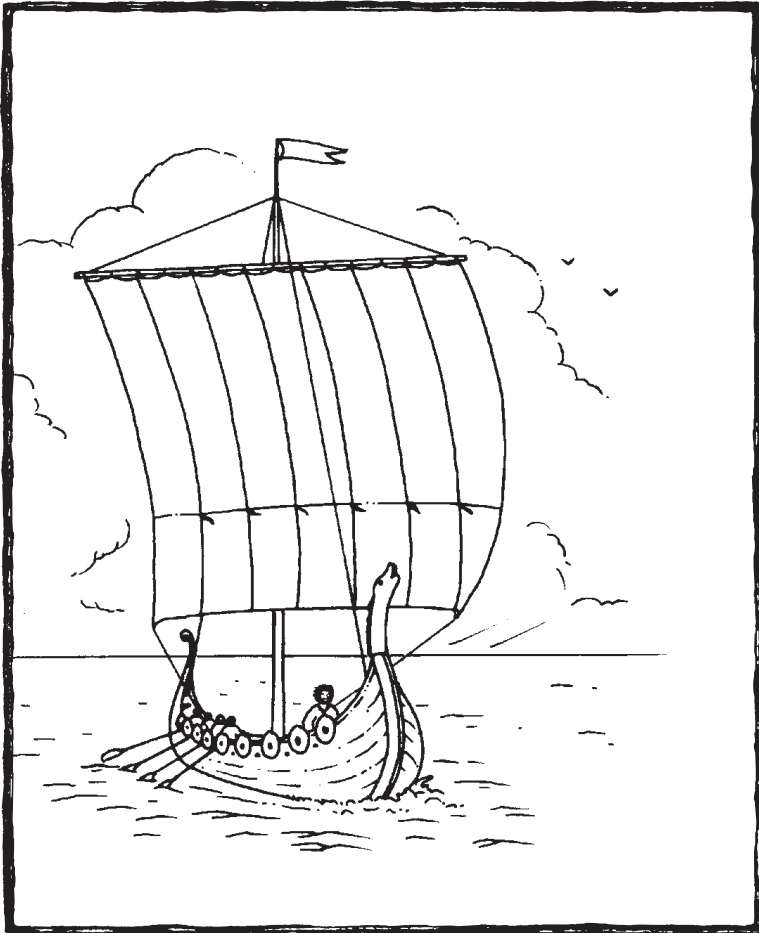
EXAMPLE: rainbow, birthday



Vikings

A Reading A-Z Level W Leveled Reader

Word Count: 1,764



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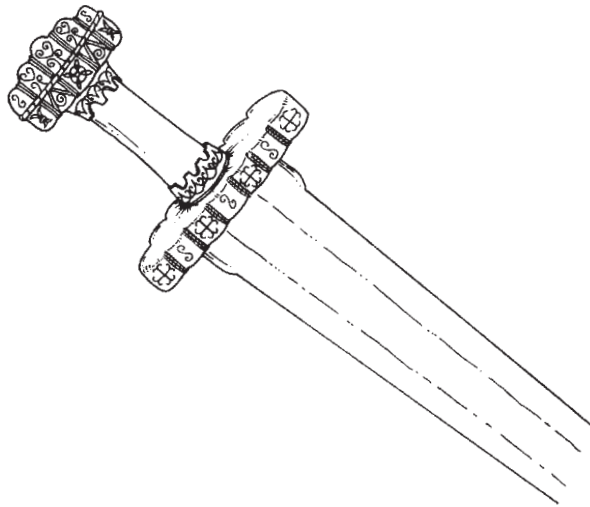
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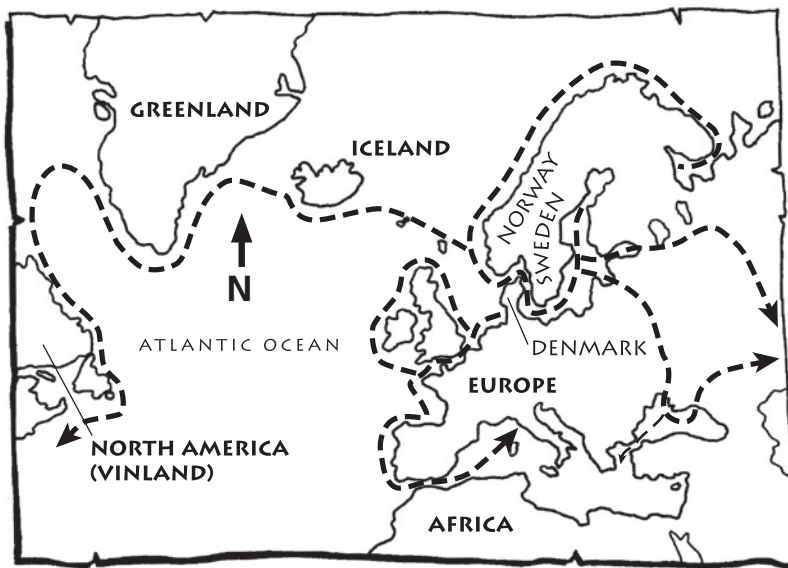
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INTRODUCTION

What do you think of when you hear the word *Vikings*? Do you think of fierce warriors or skilled explorers? Do you think of traders who traveled the world, or do you think of writers and poets? The Vikings were all of these things. They were also **shipwrights**, scientists, farmers, and fisherfolk. But often, we only think of Vikings as large and powerful raiding warriors. It's true that the Vikings were brave warriors and seldom lost a battle. They scared everyone. Yet their greatest strength may have been their love of exploration. They had the bravery to seek the edges of the unknown ocean.

The period known as the Viking Age lasted between the years of AD 793 and 1066. During that time the Vikings discovered and settled both Iceland and Greenland. They discovered North America long before Christopher Columbus. Seeking riches, they invaded many different towns and cities across Europe and Russia. They even raided the city of Jerusalem in the Middle East. **Monasteries** were frequent targets of Viking raids because they had few defenses and often housed many valuable objects.



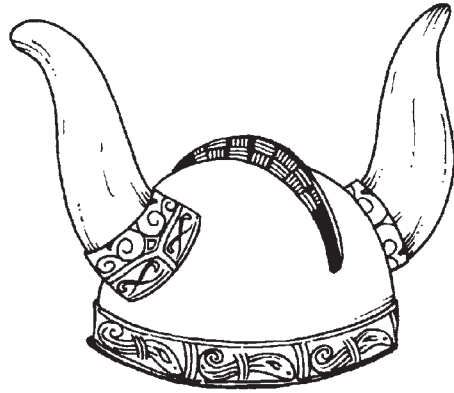
----- Viking expansion routes

The Vikings came from a harsh, far northern area of Europe. This area is now divided into the countries of Denmark, Sweden, and Norway. Vikings sailed far from their homeland to discover new parts of the world.

People of that time called Vikings the Nordic people, or *Norsemen*—men from the north. They were as harsh and rugged as the coastal lands from which they came—lands that we now know as Norway, Sweden, and Denmark. At that early time, all Nordic people spoke one language.

It was natural for Nordic people to seek their fortune on the ocean. Many of them were trained from a young age to be skilled sailors and navigators. Some sailed away for the adventure. Others did it because they could not earn their living at home. Within each family, only the oldest son inherited the family's land. Younger sons could work for the oldest son, or leave the area. Because of this rule, many young men went to sea to find their fortunes. Some turned to fishing or trading. Others made their living by stealing.

The unguarded small towns and monasteries on the coast of Britain were easy targets. Raiding Vikings would sail in quickly and steal the year's harvest from villages. They would load their fast ships and leave immediately. After the success of these early raids, they soon began to raid larger towns and even major cities. Eventually they attacked Paris and Hamburg—two of the largest cities of Europe at that time.

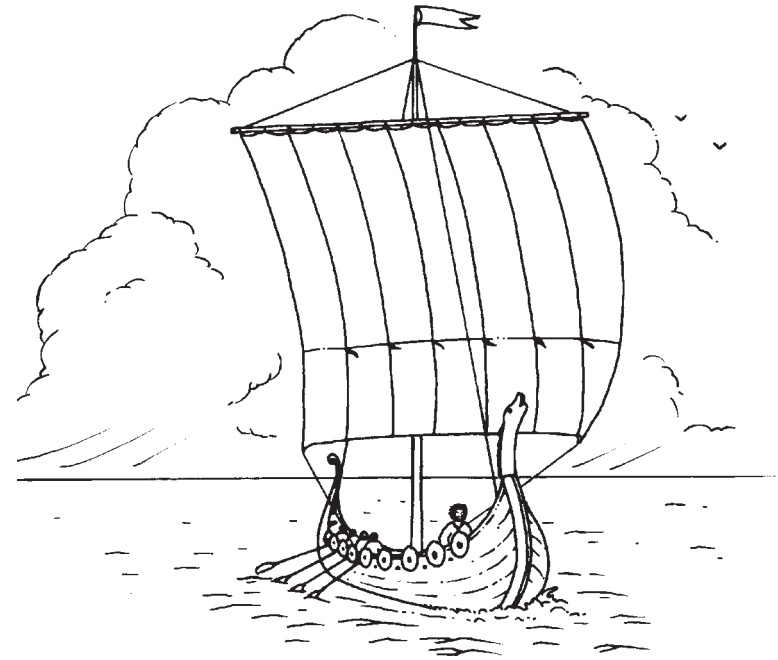


VIKING WARRIORS

Vikings are often pictured as tall, muscular people wearing helmets with horns. In fact, many Viking helmets were decorated, but they most likely did not have horns. Metal helmets were expensive, and leather caps and shields were a much more common form of defense. Some Vikings also used **chain mail** shirts for protection.

Spears and axes were the most common Viking weapons. Many warriors also used swords, knives, or bows.

Berserkers were special Viking warriors who fought without wearing any armor. They often wore the skins of bears or wolves and fought in a rage so great that they would ignore any wounds they received during battle.



VIKING SHIPS

Each type of Viking ship was built for a different use. Some were built to cross the narrow sea passages, or **fjords**. Others were used to carry cargo between towns. Larger ships were built to be coastal traders or as seagoing warships. Different woods were used to build each type of ship. Most Viking warships were made of oak in order to be strong enough for long voyages in rough seas.

Their fast ships, called *dragons*, often had a carved dragon's head high on the bow. The dragon's head warned others of the mighty warriors aboard these ships.

Viking warships had a shallow **draft**, meaning that the bottom of the ship, or **hull**, wasn't deep. Because of this feature, Viking ships were not limited to docking in ports. Viking ships could appear anywhere. They could sail right onto the shore. Warriors could leap from the ship onto the beach, ready for battle. The ability to land anywhere along the coast by surprise gave the Vikings a huge advantage in battle. People along the coasts and rivers lived in fear because no one knew where the Vikings might strike next.

Despite their **fearsome** reputation, not all Vikings remained warriors or raiders. Vikings often settled down and stayed in the lands they conquered. They put away their swords to become farmers and traders. They worked hard and lived honestly.

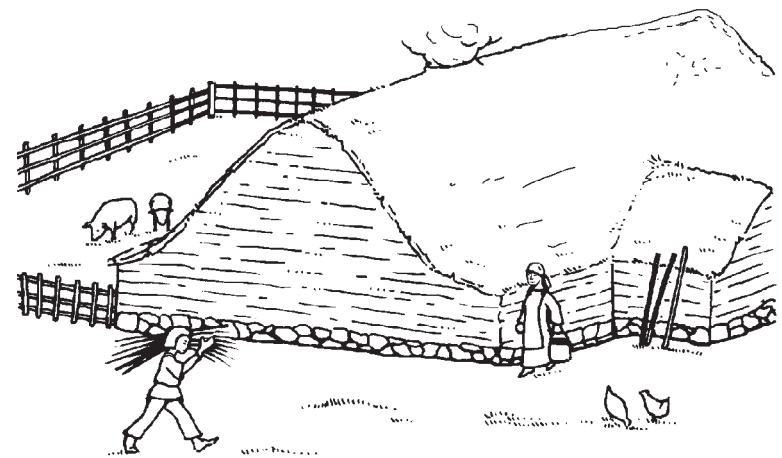
Do You Know?

The shallow Viking longship was built to be similar in the front, the *bow*, and the back, the *stern*. This design allowed the Vikings to jump in the ship and immediately row away from the coast.

DISCOVERING A NEW LAND

One brave viking, Gardard Svavarsson, wanted to find new, unknown lands. He sailed far to the north and west. After many tiring days at sea, the Viking pioneer found a large uninhabited island. The weather was cold and harsh, but he found good areas to build villages. Today, the island he discovered is known as Iceland.

Years later, Iceland's good location attracted another man who was searching for a new home. His name was Folke Vilgerdsson, and he was from Norway. At the time, Norway was ruled by a strict king. Sadly, the king's rules were harsh, and many people were unhappy. The king feared being attacked by some of his subjects. He ordered Folke and others who wouldn't follow his rules to leave Norway.



Folke, along with several other **exiled** families, sailed to Iceland. They built a village on the island. Within fifty years, four hundred people lived in this new country.

The new settlers in Iceland created one of the first **democracies**. In a democratic government, people can vote on ideas, laws, and rulers. The idea or person with the most votes usually wins. Iceland continued to attract strong, brave people who wanted to have a voice in their own lives. The **settlement** was a success. Iceland eventually grew to become one of the happiest and most successful countries in the world.



ERIC THE RED

Iceland seemed like an **ideal** place to live to many people. But not everyone fit in there. Most people in Iceland wanted a peaceful life. One **reckless** man, named Eric the Red, was often in trouble with the authorities. One day he killed three men in a fight. The officials of Iceland grew tired of Eric and ordered him to leave.

Eric had heard rumors of land even farther west than Iceland. Since he had to leave the island anyway, he set sail for this unknown land, not knowing if it even existed.

Eric the Red was named for his thick red hair.



Eric the Red sailed west and found this new land after only two days. He wanted other settlers to come there to start new lives. He told them stories about how green it was. He said it had rich valleys and game animals to hunt. He named this new land he had found *Greenland*.

People believed Eric's stories. The next year, Eric returned to Greenland, leading a group of twenty-five ships filled with people. They expected an easy journey, but the sea was very rough. Only fourteen of the twenty-five ships reached Greenland safely. The people who did arrive built two new communities about 644 kilometers (400 mi) apart. They set up a democratic government like the one in Iceland. Within ten years nearly 3,000 people had come to live in Greenland. Greenland is the world's largest island. Today, about 56,000 people live there.

Do You Know?

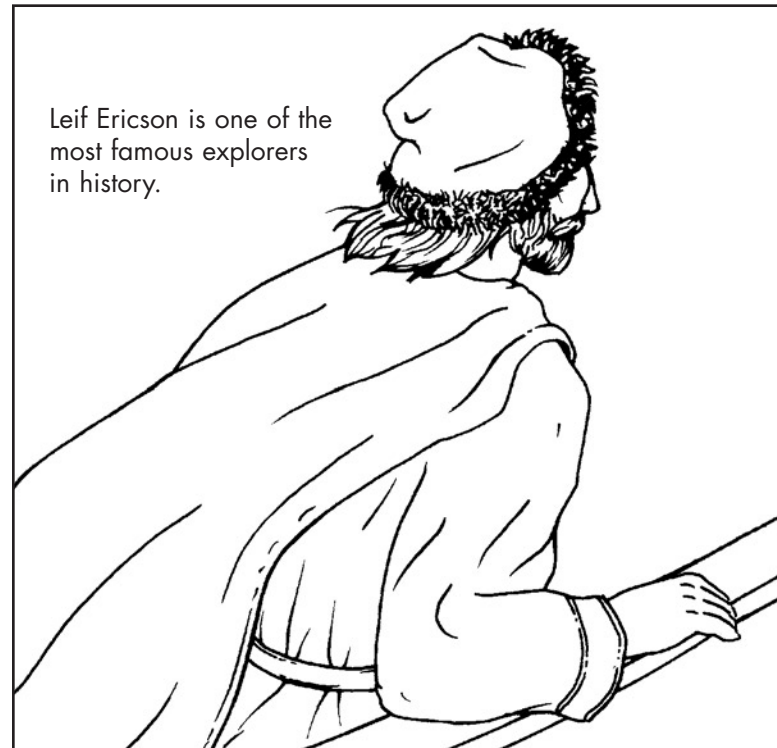
Nine hundred of the most commonly used words in English come from the Vikings (including *sky*, *skin*, *scrape*, *skirt*, *husband*, *bubble*, and *window*).



LEIF ERICSON

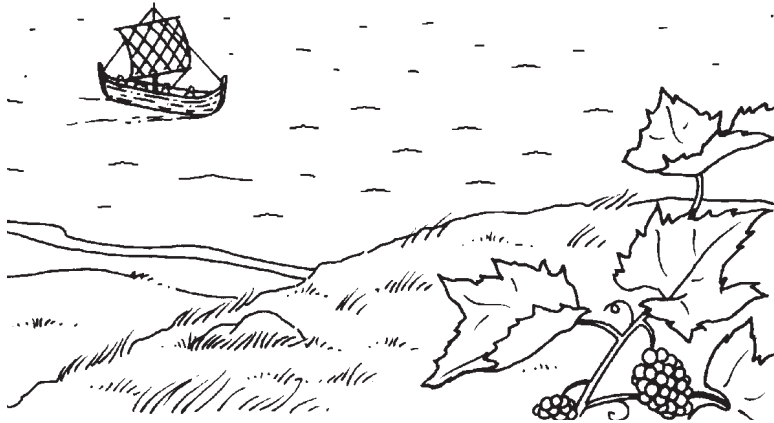
Perhaps the most famous Viking of all was the second son of Eric the Red. His name was Leif (pronounced *leaf*). In the Viking tradition, because he was "Eric's son," his name became Leif Ericson. Like most Vikings, Leif trained to be a warrior and sailor. Because he was the second son, he wasn't given land to farm. He wasn't sure what he wanted to do with his life. Leif decided to sail to Norway, his family's original homeland.

Leif Ericson is one of the most famous explorers in history.



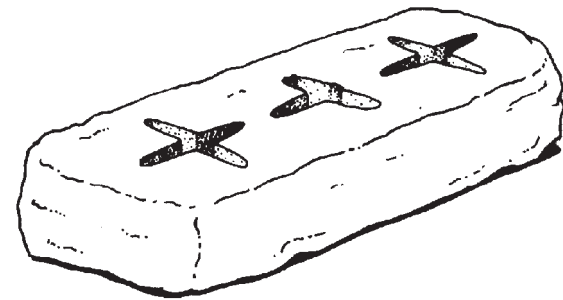
While in Norway, Leif heard a wild tale told by a trader. The trader's ship had been caught in a storm and blown far off course. While trying to find his way back home, the man had seen a coast that wasn't on his map. He didn't know where he had been when he saw this coastline. But he described it clearly.

Leif Ericson learned everything he could from the trader. He bought the man's ship. He and a small crew sailed the same route, looking for this mysterious coast. Then one day, they saw a place that looked like the land in the man's description. They found vines with fruit growing there, so they called it *Vinland*. Today, no one knows exactly where Vinland was. But **archaeologists** have discovered the remains of a small Viking outpost in Newfoundland, Canada, that was settled at about this time.



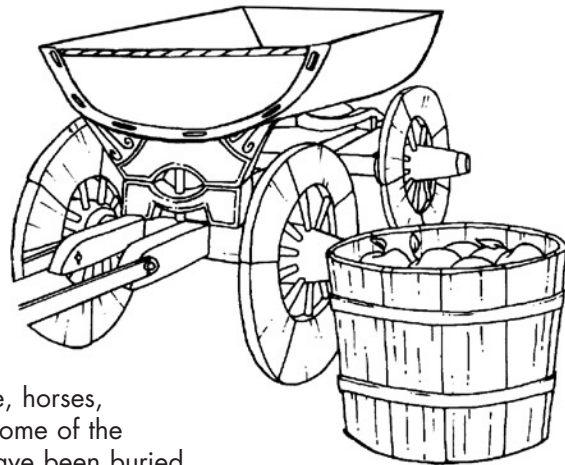
Leif and his crew built a house and spent the winter in Vinland. They sailed home to Greenland the next year. But their adventure was not over. During their return voyage, Leif found a wrecked trading ship and saved the crew. As a reward, he was given all the ship's cargo. These adventures earned him the name "Leif the Lucky." Leif never went on another voyage.

Two years later, Leif's father had died, and Leif was running the family farm. He had no thoughts of sailing. His younger brother, Thorvald, asked to borrow Leif's ship. He wanted to see for himself this land that Leif had discovered. Thorvald and a crew of thirty explored the Vinland coast for two years. They used Leif's former winter house as a base.



Serving both old and new religions, this stone was used as a mold to make both metal Christian crosses and the Hammer of Thor symbol (the center shape). Thor was a powerful Viking god.

Their explorations in Vinland brought both discovery and sadness. Their arrival frightened members of the native tribes, who had never seen Europeans. Small fights broke out. Then, men from Thorvald's crew killed several native fishermen without reason. Striking back a few days later, angry native men attacked a group of Vikings. The surprised Vikings fought hard but were chased away. Thorvald was wounded by an arrow. He died of his wound, and his body was buried in Vinland. He became the first European known to have died and been buried in North America. His crew sailed home to Greenland, but other explorers sailed to Vinland over the next three years. After those journeys, it seemed that exploring this new land was not worth the trouble it caused.

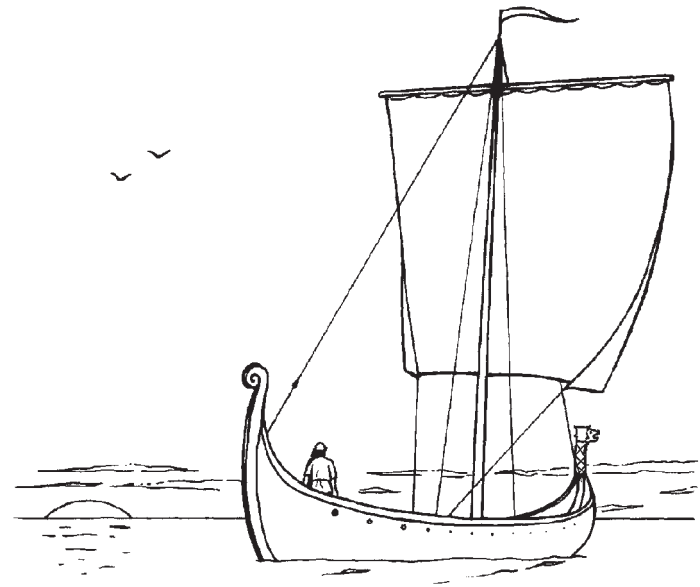


Wagons, furniture, horses, and foods were some of the items known to have been buried with their Viking owners.

OTHER VIKING CONQUESTS

For about 275 years, the Vikings swept across Europe in wave after wave. They were hungry to fight and greedy for riches. They built trade stations along European rivers all the way to the Mediterranean Sea. Viking explorers and raiders even traveled to the Middle East, Africa, and Asia.

The Vikings were skilled people. They could do many things well. They were great warriors, sailors, and explorers. Their conquests left lasting marks on world history. They will always be remembered for their bravery and strength in battle as well as for their many explorations.



TIMELINE IN VIKING HISTORY

Year	Events
790s	Viking raids in Europe, including Scotland and Ireland, begin
793	Viking raid on Lindisfarne monastery
844	Viking raids on Spain
845	Conquest of Hamburg and Paris
856–7, 861	Paris conquered by the Vikings
870–930	Norse settlement in Iceland
880s	Harold Finehair attempts to unite Norway
885–6	Siege of Paris
902	Vikings expelled from Dublin
911	Foundation of Normandy by Viking chieftain Rollo
912	Viking raiders on the Caspian Sea
917	Refoundation of Viking Dublin
930	Foundation of the Icelandic Althing
980s	Conversion of Russia
985	Eric the Red settles in Greenland
1000	Iceland converted to Christianity; voyages to Vinland
1066	Battle of Stamford Bridge, Battle of Hastings, Norman conquest of England
1066–87	William the Conqueror, king of England
1091	Norman conquest of Sicily

GLOSSARY

archaeologists (<i>n.</i>)	people who study ancient cultures (p. 15)
berserkers (<i>n.</i>)	special Viking warriors who wore animal skins and fought recklessly in battle (p. 7)
chain mail (<i>n.</i>)	flexible armor made from interlinked metal rings (p. 7)
democracies (<i>n.</i>)	governments run by the people through free and frequent elections (p. 11)
draft (<i>n.</i>)	the depth of water a ship needs to sail without touching the bottom (p. 9)
exiled (<i>v.</i>)	banned from one's city or country (p. 11)
fearsome (<i>adj.</i>)	causing fear (p. 9)
fjords (<i>n.</i>)	a narrow sea inlet between steep slopes and cliffs (p. 8)
hull (<i>n.</i>)	the main body of a ship or sailing vessel (p. 9)
ideal (<i>adj.</i>)	perfect; couldn't be better (p. 12)
monasteries (<i>n.</i>)	groups of buildings where monks live and worship (p. 5)
reckless (<i>adj.</i>)	lacking caution; careless of consequences (p. 12)
settlement (<i>n.</i>)	a new town set up on a frontier where people make a new permanent home (p. 11)
shipwrights (<i>n.</i>)	carpenters skilled at building and repairing ships (p. 4)

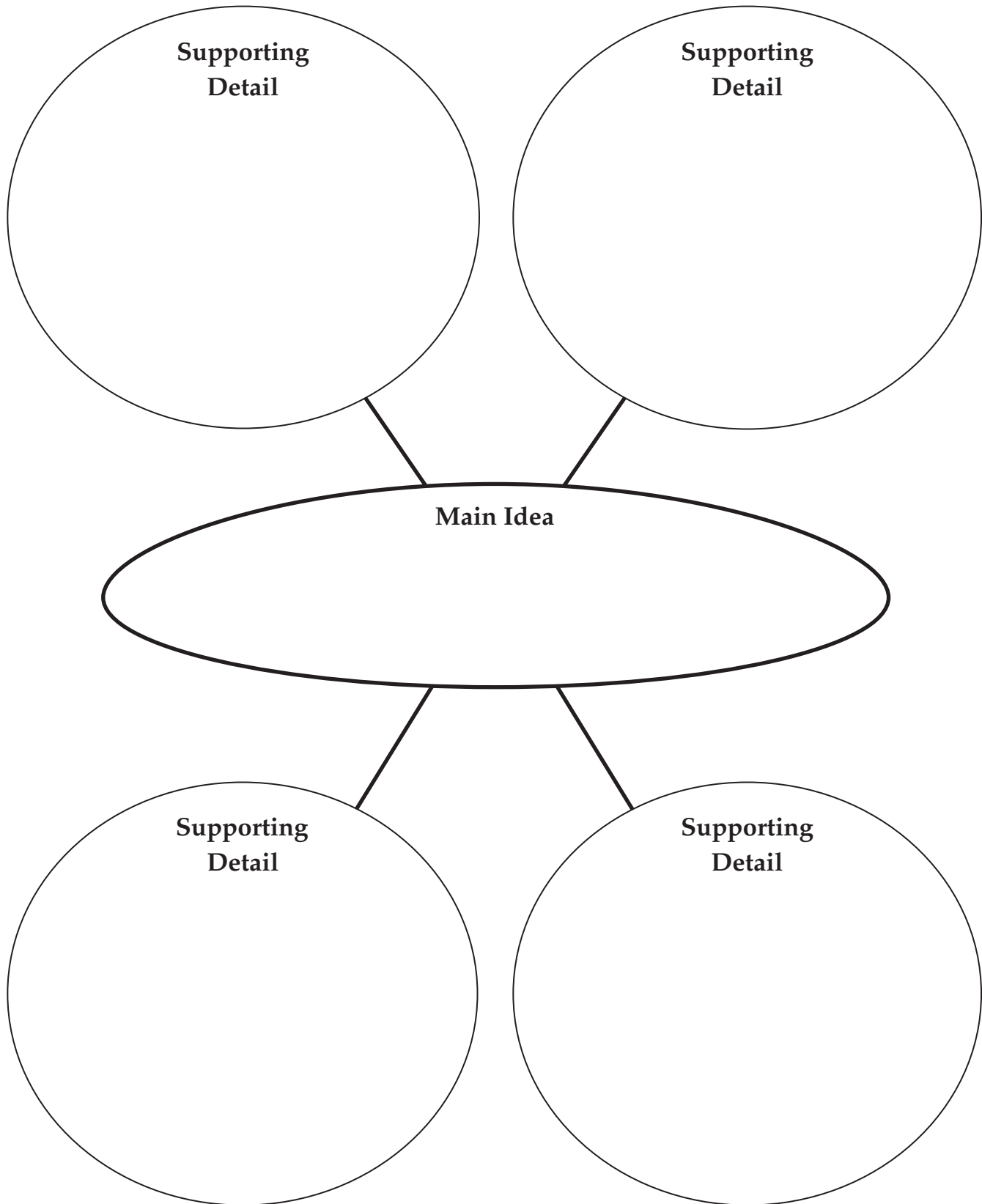
Name _____

Instructions: In the first section, write what you already know about the Vikings. In the second section, write what you would like to learn about them. After you finish reading, fill in the third section with information you learned from reading the book and the fourth section with what you still want to know.

K: What I Know
W: What I Want to Know
L: What I Learned
S: What I Still Want to Know

Name _____

Instructions: Reread the section titled "*Leif Ericson*". Write the main idea in the center of the web. Record the supporting details in the surrounding circles.



Name _____

Instructions: In the text below, circle the letters that should be capitalized. Use a red pencil to circle the letters that should be capitalized as proper nouns. Use a blue pencil to circle the letters that should be capitalized to mark the beginning of a sentence or the name of a chapter.

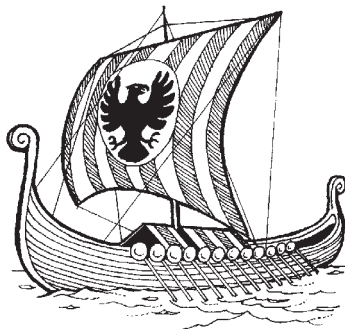
vikings

the great age of the vikings spanned the years between ad 793 and 1066. in that short amount of time, the vikings ranged far from their harsh northern homelands, sailing west to discover iceland, greenland, and north america, long before christopher columbus was even born. seeking riches, they invaded many cities throughout europe, russia, north africa, and even the middle east.

their ships were fast and could carry many warriors. some of their ships even carried horses. using their sailing skills, thirst for adventure, and bravery, the vikings conquered many lands.

people during the viking age called vikings the nordic people, or *norsemen*—men from the north. they were as harsh and rugged as the coastal lands from which they came—lands that we now know as norway, sweden, and denmark. at that early time, all nordic people spoke one language. that language has been almost entirely preserved in the modern-day speech of the people of iceland.

the vikings of denmark headed south. the vikings of sweden went into eastern europe. and the vikings of norway headed west. all of them greatly influenced the lands they invaded and changed the course of history wherever they went.



Instructions: Follow the instructions in each section below.

A. Synonyms

Write synonyms for the following words.

rugged		bigger	
fast		majority	
conquered		rescued	

B. Antonyms

Write antonyms for the following words.

mean		important	
great		older	
surprise		returned	

C. Sentence Construction

Choose four of the words from A and B and use them in a paragraph.

[illegible]